DOCUMENT RESUME

ED 413 541 CE 075 302

AUTHOR	Finch, Curtis R.; Frantz, Nevin R.; Mooney, Marianne; Aneke, Norbert O.
TITLE	Designing the Thematic Curriculum: An All Aspects Approach.
INSTITUTION	National Center for Research in Vocational Education, Berkeley, CA.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE	1997-11-00
NOTE	126p.
CONTRACT	V051A30004-97A; V051A30003-97A
AVAILABLE FROM	NCRVE Materials Distribution Service, Western Illinois University, 46 Horrabin Hall, Macomb, IL 61455 (order no. MDS-956, $14.75).
PUB TYPE	Guides - Non-Classroom (055)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Annotated Bibliographies; Apprenticeships; Career Academies; Class Activities; *Curriculum Design; *Curriculum Development; Curriculum Evaluation; Data Collection; *Delivery Systems; *Education Work Relationship; Educational Environment; Educational Needs; Employment Qualifications; High School Seniors; High Schools; Information Utilization; *Integrated Curriculum; Interdisciplinary Approach; Job Skills; Magnet Schools; Mentors; Partnerships in Education; Portfolios (Background Materials); Student Evaluation; Tech Prep; *Vocational Education; Work Experience Programs; Youth Employment
IDENTIFIERS	Job Shadowing; School Based Enterprises

ABSTRACT

This guide focuses on two interrelated areas of developing vocational education curricula: designing a thematic curriculum and using the "all aspects of the industry" approach when creating thematic curricula. The following are among the topics discussed in the guide's eight sections: principles of the thematic curriculum and its potential to improve education; curriculum options (understanding the impact of change, identifying potential barriers to change, making change happen, identifying and examining options); contextual options (individual courses, clusters and majors, career academies, magnet schools, strengths and limitations of contextual options); organizational options (traditional arrangements, tech prep, integration, school-to-work transition); delivery options (school-based enterprises, linkages and partnerships, job shadowing, mentoring, youth apprenticeships, portfolios, senior projects); content options (documenting needs and identifying, selecting, organizing, integrating, and updating content); strategies for linking curriculum with instruction (school- and work-based teaching and learning strategies and strategies connecting school and workplace); and steps in assessing and refining the curriculum (gathering, examining, and using assessment information for curriculum improvement). A total of 22 figures and 103 references are spread throughout the document. Appended are the following: sample themes; examples of content organized around themes; sample career clusters/pathways/majors; examples of theme-wide functions, issues, concerns, and technological knowledge and skills; and an annotated bibliography of 29 related materials, reports, and resources. (MN)

ED 413 541

NCRVE

Designing the Thematic Curriculum: An All Aspects Approach

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Norbert O. Aneke

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Vocational Education

University of California, Berkeley

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MDS-956 • November 1997

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Supported by
The Office of Vocational and Adult Education,
U.S. Department of Education

FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education
Grant Number:	V051A30003-97A/V051A30004-97A
Act under which Funds Administered:	Carl D. Perkins Vocational Education Act P. L. 98-524
Source of Grant:	Office of Vocational and Adult Education U.S. Department of Education Washington, DC 20202
Grantee:	The Regents of the University of California c/o National Center for Research in Vocational Education
	2030 Addison Street, Suite 500 Berkeley, CA 94720-1674
Director:	David Stern
Percent of Total Grant Financed by Federal Money:	100%
Dollar Amount of Federal Funds for Grant:	$4,500,000
Disclaimer:	This publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
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Getting to Work: A Guide for Better Schools

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MDS-GTW/December 1995

Education for All Aspects of the Industry: Overcoming Barriers to Broad-Based Training

This study looks at one educational reform strategy—All Aspects of the Industry (AAI)—called for by Perkins II and designed to broaden student experiences. AAI explores planning, management, finances, technical and production skills, underlying principles of technology, labor and community issues, and environmental issues. The purpose of this report is to help the educational community develop the AAI strategy. By T. Bailey, R. Koppel, R. Waldinger.

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All Aspects of the Industry: Bringing Industry into the Classroom

The objective of this teleconference, recorded October 12, 1994, was to discuss the merits of All Aspects of the Industry. The teleconference provided participants with an orientation to AAI; suggestions about how academies, school-based enterprises, youth apprenticeships, and other program structures can be designed to encompass AAI; strategies for implementing AAI into the classroom; and ways that local and state policies and technical assistance can assist programs in including AAI. Videotape.

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As Teachers Tell It: Implementing All Aspects of the Industry

All Aspects of the Industry (AAI) is a powerful reform approach that combines the real world richness of vocational education with the broad, transferable skills associated with academic education. AAI means providing students with a strong understanding of what AAI encompasses (i.e., planning; management; finance; technical and production skills; underlying principles of technology; community issues; labor issues; and health, safety, and environmental issues). *As Teachers Tell It* includes extensive case studies (885A) on implementing AAI from four schools. Teams of teachers and business representatives, collaborating with national organizations, spent a year developing their own case studies on the reform process. The case studies demonstrate the power of AAI in accelerating vocational and academic integration and strengthening work-based learning. They show how AAI ensures that students are not locked into the industry they focus on, and helps prepare students for a rapidly changing work world. *As Teachers Tell It* includes a comprehensive introduction to AAI; a section relating AAI to other reform streams; and an appendix (885B) with further resources. This groundbreaking study will be useful both to those interested in AAI, and to everyone engaged in the complex processes of school change. Edited by E. Nielsen-Andrew.

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Acknowledgments

Our task could not have been completed without assistance from others. Appreciation is extended to the many administrators and teachers at schools we visited who helped us gather information about "all aspects" and the thematic curriculum. These schools included Central High School Magnet Career Academy, Louisville, Kentucky; Chicago High School for Agricultural Sciences, Chicago, Illinois; Dauphin County Technical School, Harrisburg, Pennsylvania; Minuteman Regional Vocational High School, Lexington, Massachusetts; Health and Bioscience Academy, Oakland Technical High School, Oakland, California; Rindge School of Technical Arts, Cambridge, Massachusetts; and the Travel and Tourism Academy, William Fleming High School, Roanoke, Virginia.

The opportunity to provide assistance to several high schools who were in the formative stage of thematic curriculum implementation was as much a learning as a helping experience. We are greatly appreciative to administrators and teachers at Charlottesville High School, Charlottesville, Virginia; Colonial Heights High School, Colonial Heights, Virginia; and Franklin County High School, Rocky Mount, Virginia, for allowing us to become involved with their important implementation tasks.

Appreciation is also extended to Eileen Keeney at our NCRVE Virginia Tech Site, and Jen Goodreau, Plaid River Designs. Without their word processing and desktop publishing expertise and contributions, we would still be trying to figure out how to get all these words in their proper format.

This publication is dedicated to Nevin Frantz who passed away on May 29, 1997. Nevin co-directed the project that served as a basis for this guide and made significant contributions to the guide content. He was a leader, scholar, and friend who will be missed by all.

Executive Summary

This guide evolved from both a need and an opportunity. The *need* relates directly to schools and schooling. For some time, student involvement in broadly framed, contextualized life and living experiences has been recognized as being beneficial. Students can benefit from this involvement in several ways; most important, they can become more engaged as learners, better prepared for further studies, and better equipped to enter the work world. Unfortunately, many school curricula have been modeled after the traditional factory assembly lines that were first established in the early part of this century. Just as an automobile travels down a predetermined path with workers adding part after part to its frame, students in traditional educational settings move from course to course and end up some time later gathering all the required "parts" to qualify for graduation. As automobiles reach the end of the traditional assembly line, they are supposed to be driven away. An embarrassingly large number of our students are not properly prepared and need to undergo remedial work in an effort to rectify the education process. Some of the students are helped, but others are not. Many of these underprepared students never achieve their personal or work potential.

Beginning in the 1970s, some U.S. automobile manufacturers began to recognize their inability to compete with foreign automobile manufacturers. They rapidly discovered that their traditional production lines were inefficient and outdated. Dramatic changes in automobile production were made and new production approaches such as total quality management, self-directed work teams, and just-in-time parts delivery eventually had a major positive impact. Automobile production and resultant product quality greatly improved and U.S. automobile manufacturers have since gained back some of their lost market share.

Can the same be said about schools and schooling? Is a traditional "assembly line" schooling model the best way to go? And even more important, are graduates prepared for life and living? Are they able to compete in the world class workplace? According to the Goals 2000 initiative, our Nation's schools must maintain a very busy schedule if educators ever hope to prepare graduates who can compete head-to-head with graduates living in other industrialized nations. Herein lies the need for this guide, which has as its purpose effecting meaningful curriculum change that assists students in gaining a competitive edge, both in life and living.

The *opportunity* to prepare this guide came through support provided by the National Center for Research in Vocational Education (NCRVE), which is funded by the U.S. Department of Education. Our NCRVE project examined how "all aspects of the industry," a concept described in recent

federal legislation, might be incorporated into school curricula. Building on an "all aspects" project funded by the Joyce Foundation, our effort focused on three areas: (1) identifying curriculum practices and processes that emphasize the long term; (2) preparing a guide that describes these long-term curriculum practices and processes and the ways they may be designed; and (3) assisting educators at selected school sites with their curriculum implementation. Information about curricula was gathered through interviews with educators at selected schools around the United States where long-term curricula are operational.

Our examination of the ways "all aspects" was being used in the schools and discussions with educators led us to several conclusions. First, many people do not understand what "all aspects" is. This lack of understanding causes people to view "all aspects" as anything from training for industry to industry-based education and education in industry. In particular, the term "industry" tends to confuse and mislead many people. Our second conclusion was that "all aspects" is most beneficial as a process rather than an outcome. Conceptually, we have come to view "all aspects" as a very important contributor to thematic curriculum development. From a more applied vantage point, we see "all aspects" as serving a useful function in creating curricula that are based on encompassing and powerful themes.

We have thus prepared a guide that focuses on two interrelated areas: (1) designing the thematic curriculum and (2) utilizing "all aspects" in the creation of this curriculum. The guide is organized into eight sections that parallel stages in the curriculum design process. In Section 1, the thematic curriculum and "all aspects" are introduced and described. Details about the value of thematic curriculum design are also presented. Section 2, which includes an overview of the design process, begins with a description of why it is important to view change as a process that can have positive impact on curriculum design. Next, the various options available to curriculum designers are introduced. In Sections 3, 4, and 5, the curriculum options are described in more detail. Contextual, organizational, and delivery options that may be imbedded in or linked directly with the thematic curriculum are detailed. Persons who are familiar with these options may want to skip directly to Section 6 where the process of identifying, selecting, organizing, and integrating content is explained. Section 7 focuses on linking curriculum and instruction. Since this area is often neglected during the curriculum design process, we chose to describe various teaching/learning strategies that can be used to improve instruction in school-based and work-based settings as well as settings in which the school and the workplace are connected. In Section 8, a description of curriculum assessment and refinement is provided. The need to maintain and improve curriculum quality demands that periodic assessment be conducted and that refinement based on assessment results be completed. Using "all aspects" in the design process helps ensure that curriculum

themes are broad and inclusive rather that narrow and exclusive. Rounding out the guide are five appendices that include a wide range of examples and suggestions to assist in the creation of quality thematic curricula.

The preparation of this guide has been a curriculum building process that we have thoroughly enjoyed. We are confident this resource will provide others with an equally pleasant journey as they seek to create their own thematic curricula.

November 1997

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SECTION 1

The Thematic Curriculum: An Introduction

Overview

What are the "thematic curriculum" and "all aspects?" Why are they important? Although these phrases are relatively recent additions to educators' vocabularies, they have existed in one form or another for many years. To assist in describing what the thematic curriculum and all aspects of the industry are, this introductory section focuses on their definitions and distinguishing characteristics. Also included are descriptions of what has been learned about the thematic curriculum and the potential it has to improve education.

The Thematic Curriculum

Consider this. What do the Bronx High School of Science, the Fashion Institute of Technology, the Chicago High School of Agricultural Sciences, the Oakland Academy of Health Sciences, and Valley Forge Military Academy have in common? Obviously, they all provide students with some form of education. However, each offers education that is linked to and imbedded in a broad content theme. For example, at the Chicago High School of Agricultural Sciences all students have exposure to agriculture; and through this exposure, they are able learn trigonometry, biology, physics, and other subjects within an agricultural context. Students at Valley Forge Military Academy (a private school that offers a high school diploma and a two-year associate degree) participate in a wide range of military experiences as they study world history, geography, American government, and other courses. Students' active involvement in military experiences serves as the "contextual glue" that holds the curriculum together.

So what then is a thematic curriculum? It is a set of organized learning experiences such as programs, courses, and other school-sponsored activities that provide students with exposure to a broad, predominant content theme. This broad theme can serve an entire school as is the case of the Fashion Institute of Technology, a postsecondary institution in New York City which claims Calvin Kline as one of its graduates. Alternatively, a theme may be the focal point for a school within a school which is the case of the Health and Bioscience Academy, an academy that operates as a school within Oakland (California) Technical High School. Or a theme may be used to provide students with a context where they can demonstrate

self-motivated learning. This is perhaps exemplified by the International Baccalaureate, a globally focused curriculum offered by hundreds of high schools around the world to self-directed students who thrive in academically challenging learning environments.

Figure 1-1. Examples of Thematic Curricula

- Agriculture
- Arts and Media
- Business Management and Marketing
- Construction and Environmental Technology
- Communication
- Engineering and Mechanical
- Global Studies
- Manufacturing
- Medical and Human Services
- Military Science and Leadership

Presented in Figure 1-1 are examples of thematic curricula that may be found in schools across the United States. A theme may serve as an organizer for an entire school or multiple themes may be established for subsets of the school. These multiple themes are sometimes referred to as clusters, majors, and academies. The examples given are merely representative of the many titles educators have chosen for themes in their schools. Additional examples may be found in the appendices.

And of what value is a thematic curriculum? Value is largely dependent on what educators see as being important for their students. A few of the possible benefits available to students through the thematic curriculum include

- opportunities to learn through more contextualized learning experiences.
- exposure to linkages between school-based learning and learning that occurs in the workplace and the community.
- opportunities to explore a wide range of authentic experiences.
- in-depth exposure to a broad field of interest.
- opportunities to examine what a wide range of occupations has to offer.
- greater academic potential in preparation for both higher education and employment.
- ability to determine exceptional / unusual interests.

Benefits from thematic curriculum use may also accrue for educators. Depending on the curriculum configuration, several possible examples include providing opportunities for

- teachers to work together as members of self-directed professional teams with powerful learning strategies.
- counselors' efforts to have greater positive impact on students.
- administrators to demonstrate leadership in improving the school climate and helping more students to have successful school experiences.

With the thematic curriculum briefly described and some of its benefits detailed, how may this curriculum be designed? The design answer begins with an introduction to "all aspects" and continues throughout this guide.

All Aspects and the Thematic Curriculum

Comments such as "we have been teaching all aspects of industry for years" and "every student receives plenty of this all aspects instruction" may infer that "all aspects" exists in a school. However, in order to determine the validity of these statements, a thorough understanding of all aspects of industry (AAI) is required. One source of understanding consists of statements about "all aspects" contained in recent legislation. "All aspects" was first mentioned in federal legislation as part of the Carl D. Perkins Vocational and Applied Technology Act of 1990 (Perkins II). A provision in this act called for students to have "strong experience in and an understanding of those aspects of industry the students are preparing to enter." In the Perkins II legislation, educational activities associated with "all aspects" were also described. These include "planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environment issues" (American Vocational Association, 1990, p. 66). More recently, the School-to-Work Opportunities Act of 1994 amplified the need for focusing on "all aspects" in the schools. In the school-to-work legislation, "all aspects" is viewed as a valuable component of and contributor to school-to-work systems.

What then is "all aspects"? Is it defined by legislation or is it defined by whatever educators in each school and school district decide it should be? At the very least, it can be said that "all aspects" will evolve just as education and workplace needs and practices evolve. As with other strategies, "all aspects" will not be driven solely by legislation nor will it ever be defined in precise terms. Likewise, "all aspects" may vary as a function of the context or contexts in which it is used. And finally, it should be recognized that "all aspects" is a curriculum development strategy. It best serves as an organizer for curriculum rather than an end in itself.

A review of curricula from the past, an examination of federal legislation, visits to schools with curricula that utilize "all aspects," and discussions with persons in these schools have all contributed to the development of what may be referred to as key "all aspects" factors (see Figure 1-2). The factors serve two purposes: first, they assist in defining the main features of "all aspects" and second, they help to determine whether "all aspects" has been used to assist in creating an educational curriculum. Using these factors to help define "all aspects" has its limitations. They include the possibility of misinterpreting words and statements, restricting one's view of what "all aspects" may be, and reliance on somewhat abstract factors to

decide what "all aspects" is. However, for the present, other options appear to have even greater limitations. For example, strict adherence to statements about "all aspects" drawn from legislation might exclude from consideration some of the fine curriculum work of the past. And excluding certain phrases and words based on legislation might cause people to ignore important statements found there.

Figure 1-2. Key "All Aspects" Factors*

Listed below are several factors that distinguish "all aspects." The first five factors are considered essential to "all aspects," whereas, factors six through eight are highly recommended since they have been shown to enhance the benefits "all aspects" offers to students.

1. **"All aspects" encompasses a broad "industry" or field within the workplace. Illustrative fields include agriculture, business, construction, communication, community services, health, manufacturing, marketing, and transportation.**
2. Curriculum content and focus includes instruction in a wide range of industry or field-wide functions, concerns, issues, and technological knowledge and skills. Illustrative of the areas are community issues, environment issues, economic issues, finance, health, labor issues, leadership, management, planning, safety, technological knowledge and skills, and underlying principles of technology.
3. Instruction includes strong emphasis on developing problem-solving skills and basic and applied academic skills in technological settings. Academic studies focus on mathematics, oral communication, reading, writing, science, and social and behavioral sciences instruction.
4. Students are provided with extensive experience in and an understanding of those aspects of the broad industry of field they are exploring and/or preparing to enter.
5. Students completing the instruction are able to link their school studies and related experiences directly to a broad industry or field, including the functions, concerns, issues, and technological knowledge and skills associated with that industry or field.
6. Teachers actively collaborate with each other in determining content and experiences, planning instructional strategies, and teaching in a manner that integrates instruction and emphasizes contextualized, applied learning.
7. "All aspects" is available to all students (in the school district, school, magnet school, academy) regardless of their future education and employment plans and aspirations.
8. "All aspects" is creatively and effectively combined with educational reforms to produce a comprehensive school-to-work system.

*Included in the above statements is some information extracted from the Perkins II and School-to-Work Opportunities Acts.

Referring again to Figure 1-2, eight factors distinguish "all aspects." The first five factors are deemed essential, whereas, factors six through eight

are important contributors to its success. Although factors six through eight are not always essential to success, they enhance the potential for "all aspects" to be successful. These factors may be useful in providing flexibility in the thematic curriculum development process.

Themes from the Past

Contemporary views of thematic curricula have been shaped by the need to provide student learning through more comprehensive exposure to working and living. For a number of years, educators and others have sought to create curricula that exposed students to broad industries and fields. Early work in this area tended to result in curricula and courses that focused on either preparation for life or preparation for earning a living.

During the late 1950s, employers began to recognize that skilled workers often did not have facility in higher levels of knowledge and skills associated with emerging technology and technological fields. As more and more employers recognized the need for technicians in the workplace, educational institutions responded by creating curricula that prepared graduates who had both technical depth and breadth. Depth included studies in mathematics and science that were more rigorous than what skilled workers received and somewhat less rigorous than what was offered in engineering programs. Breadth included studies that exposed students to the field they were preparing to enter (e.g., electronics technology, design) as well as collateral areas such as accounting and management. Descriptions of this preparation phenomenon contrasted what was, at the time, termed "field-oriented" and "job oriented" employment preparation. Field-oriented preparation focuses on enabling graduates to enter a broad array of occupational areas within an industry or field, whereas, job-oriented preparation emphasizes preparing graduates for specific jobs such as electrician, machinist, welder, and drafter (Finch, 1968).

During this same period, some educators began to be concerned that secondary school students were not being given opportunities to learn about the comprehensive nature of industries. Ready for change and eager to shed a manual training / manual arts image, Industrial Arts educators began to reconstruct the Industrial Arts curriculum so it encompassed entire industries. Industrial Arts curriculum models that emerged during the 1960s included, for example, the American Industry model that focused on concepts common to all industries of the day and the Industrial Arts Curriculum Project that included instruction on both the world of manufacturing and the world of construction (Cochran, 1970). Each of these models was designed to help students learn about industry in its broadest sense. These Industrial Arts curriculum models were not intended to prepare students for employment; their focus was on preparing students for life. Even though Industrial Arts has evolved into Technology Education,

the study of various industries continues to be emphasized in some secondary level Technology Education programs in various parts of the United States. This is evidenced by current Technology Education text book titles such a *Manufacturing Technology, Production Systems Technology,* and *Power and Energy Technology* (Jones, 1995, p. 66).

As the field of agriculture evolved, this evolution led to significant change in what Agricultural Education instructors felt should be taught to their students. During the 1960s, educators explored ways that agriculture curricula might be designed to offer students a more comprehensive view of the field. Using a strategy called the function approach (Finch & Crunkilton, 1979), researchers were able to identify content in terms of unifying characteristics or themes across a particular industry or business. Thus, by building curricula from a function base, students are given opportunities to learn about a broad range of areas within a field. This early effort in Agricultural Education curriculum contributed greatly to current emphasis in the schools to learn about agriculture as a broad, multifaceted area of study (e.g., agribusiness, agriscience).

What Do We Know about the Thematic Curriculum and All Aspects?

Although research focusing on the thematic curriculum has been limited, studies conducted over the past several years by NCRVE that focus on "all aspects" offer some meaningful insight. Information gleaned from these studies (Bailey, Koppel, & Waldinger, 1994; Finch & Mooney, 1996; Nielsen Andrew, 1994) and other sources is summarized below:

- The thematic curriculum can be implemented in a variety of ways (e.g., course by course, academy, cluster, magnet, entire school).
- The thematic curriculum is easily combined with other reforms such as integration of vocational and academic education, Tech Prep, and school-to-work transition.
- Thematic curricula may be best suited for secondary school, however, postsecondary, middle school, and elementary school examples do exist.
- Thematic curricula can serve as a bridge to unite school- and work-based learning experiences.
- Some employers and educators have difficulty understanding and accepting the thematic curriculum.
- Workplace barriers such as labor supply concerns, short-term production demands, and tradition have limited the implementation of thematic curricula built from an "all aspects" base.
- Early efforts at curriculum creation which focused on learning about broad industries and fields offer much useful information to those who are interested in using "all aspects" to formulate their thematic curricula.

- Some schools may already have incorporated themes into their curricula, but do not realize this.

More detailed information about how thematic curricula can improve education and ways of applying what has been learned is presented in later sections.

The Thematic Curriculum's Potential To Improve Education

Ultimately, success of the thematic curriculum will depend on how well it improves education. Although research about the impact thematic curriculum can have on teaching and learning is very limited, some schools have had from five to ten years of experience working with themes built upon "all aspects." Persons who are focusing on themes in these schools note why they continue to teach this way. They indicate the thematic curriculum is more effective at reaching a broad range of students. In more specific terms, thematic curricula built on an "all aspects" framework have the potential to provide all students with several important benefits (Nielsen Andrew, 1994, p. 2):

- Providing an enriched environment in which vocational and academic education integration can occur
- Providing students with the broad range of skills and experiences they need for a variety of workplace tasks and roles, including entrepreneurship and management
- Facilitating students' school-to-work transition
- Encouraging community development through collaborative involvement in economic growth activities
- Providing a rich platform for analysis, problem solving, and utilizing skills in reading, writing, mathematics, science, and social science
- Helping students to explore an industry or field in depth while gaining transferable skills that expand their opportunities to do other things

Of course, there are other potential benefits of thematic curricula such as assisting students in making more informed career choices and preparing them to be better citizens and workers. Some of these potential benefits are a function of how "all aspects" is used and how well it is used as a strategy for curriculum design. Thus, for persons who are ready to accept the challenge of creating thematic curricula, there is great potential to obtain a rich return on the investment.

Summary

Even though the thematic curriculum has been around for quite some time, its adoption by schools has been limited. This situation is in part a function of an ambiguous definition. To some extent, "all aspects" has been defined by legislation. However, it appears that "all aspects" will never be driven entirely by legislation nor will it be defined in precise terms. The factors associated with "all aspects" serve to define and guide a thematic curriculum with essential and highly recommended elements. The factors also provide flexibility in ways that "all aspects" can be incorporated into the thematic curriculum development process.

Lessons from the past reveal that, even though the thematic curriculum is a new phrase, its antecedents have been present since the 1950s. Likewise, recent research shows that much has been learned about thematic curricula using "all aspects" as a framework for developing and implementing curricula in the schools. Educators who have been working with thematic curricula for a number of years have noted the many benefits it has for students, ranging from facilitating students' school-to-work transition to providing an enriched environment for learning. Additionally, "all aspects" has been shown to serve as a meaningful strategy when creating the thematic curriculum, particularly for themes that emphasize broad industries and fields.

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SECTION 2

Exploring Curriculum Options

Introduction

The thematic curriculum may be configured in a variety of ways. Since how various themes are arranged can affect what is taught and how it is taught, different implementation options should be explored early in the development process. This is begun by discovering how change may impact on students, teachers, administrators, support staff, and others. After the potential impact of change has been addressed, available curriculum options can be examined. Contextual, organizational, delivery, and content options are introduced in this section and discussed more extensively in Sections 3, 4, 5, and 6. The exploration of different options logically leads to decision making. This includes weighing the various options individually and collectively; giving consideration to the impact they may have on students, educators, and others; and ultimately deciding what form the curriculum should take.

The Impact of Change

The great interest in educational reform and emphasis on implementing change in the public schools has left many education professionals with a feeling that the only thing constant in education is change. This feeling is clearly bothersome to educators who desire curriculum reform. Administrators, teachers, and others in the schools are being bombarded with so many different changes, often to the point that it is difficult to tell where one change ends and another begins. Educators who have been through several cycles of what some view as "change for the sake of change" are found to be more negative or at least less positive toward change (Glatthorn, 1992).

Potential Barriers to Change

Without proper consideration, thematic curricula can easily fall into the category of "just another one of those changes." For this reason, persons who create curricula must consider potential barriers to educational change. Many of the more commonly encountered barriers to educational change have been noted by Harvey (1990, pp. 35-45). Examples of these barriers include lack of ownership in change, lack of benefits from change, increased burdens resulting from change, and a lack of support from administration. Educators involved in change may feel a sense of loneliness, insecurity,

and boredom. They may also believe they are not receiving enough information about the change and that they are not properly recognized for their participation in the change process. Educators may feel the change will not be successful because the process lacks control or is being made too fast. They may also feel the school's or school system's organizational structure or unique problems are such that change will be difficult to implement. Several of the general comments made by educators that reflect these concerns are listed in Figure 2-1. These statements about change are not abstract concepts. They can often be overheard in schools where change is being implemented. If statements like these are heard, it is important to identify the root cause of each and work to be sure that barriers to change are removed.

Figure 2-1. Comments Made by Educators That May Reflect Concern About Change

- The change is being imposed by others.
- The change gives us no advantages over what exists now.
- We don't have time to be involved in the change.
- We have no commitment from the top to this change.
- I don't want to be the first to try something new.
- This change threatens my job security.
- We don't do it that way here.
- This change is dull, burdensome, and uninteresting.
- We have little control over the way this change is going.
- They told us to trust them and later on we would like the change.
- We don't receive the same information about the change that others received.
- We are never acknowledged for our work on the change.
- This change is being made too fast.
- They said the change was tried before and failed so we should try it again.
- This school (or school system) is too highly centralized (or decentralized) to allow for successful change.
- Our schools have very special problems.

Consideration should also be given to barriers that may impact specifically on thematic curriculum implementation in the schools. Several barriers to "all aspects" identified by Bailey, Koppel, and Waldinger (1994) are quite relevant since "all aspects" can serve as a meaningful strategy for creating thematic curricula. They include the educational preparation of entering students, the conflict between short-term needs and long-term benefits, and the threat to tradition.

The Educational Preparation of Entering Students

Educators in the schools Bailey et al. (1994) visited where "all aspects" had been used "complained about the skills of their entering students" (p. 110). It was noted that "educators who tried to broaden their curricula complain that many students simply do not come in with the basic skills to

handle a broader, more sophisticated, and more conceptual curriculum" (p. 110).

The Conflict Between Short-Term Needs and Long-Term Benefits

Preparing students for employment often involves a curriculum trade-off between what the workplace needs in the short term and what its needs will be in the long term (Bailey et al., 1994). Since "all aspects" reflects broadly based preparation and implies preparation for the high performance workplace, educators may be faced with a difficult decision. This is because the content that is ultimately selected may affect whether or not students are prepared for employment in the traditional or the high performance workplace. It appears that in the future most firms will be smaller and without training clout. Larger firms may lead the way in high performance training needs but hire few people. Given the rather small percentage of firms that have become high performance workplaces and the slow rate at which firms are moving in this direction, educators may be reluctant to shift from traditional to nontraditional curricula.

The Threat to Tradition

Both educators and employers may see the broadly based thematic curriculum as a threat to tradition. Employers may view it as something that does not align with their ways of doing business; whereas, educators may see it as content breadth at the expense of depth or the merger of traditional courses and sequences into an unidentifiable lump. In effect, during implementation, tradition can easily get in the way of change. Employers and educators who are set in their ways may themselves be one of the most serious barriers to broadly based curriculum implementation and success (Bailey et al., 1994).

Making Change Happen

How can these barriers be dealt with effectively? Several approaches to fostering educational change used in conjunction with other educational reforms have much relevance to implementation of the thematic curriculum (Finch, Schmidt, & Faulkner, 1992). These approaches apply in various ways, depending on the nature and focus of the change. Ways educational change can be enhanced are included in Figure 2-2. These suggestions apply to many of the educational reforms that are currently being initiated in schools across the country. Although some local adaptation may be necessary, the list has much relevance to thematic curriculum design and implementation.

Dealing more specifically with "all aspects," Bailey et al. (1994, pp. 111-115) have identified several ways that barriers to "all aspects" development and implementation may be overcome. These barriers, which are listed in more general terms in Figure 2-3, have much relevance for thematic

Figure 2-2. Enhancing Educational Change

- Empower all educators. Provide opportunities for teachers and support staff to make significant curriculum and instruction-related decisions.
- Schedule times when educators can meet and work together. Change to a curriculum cannot take place unless educators have quality time to meet and plan joint teaching activities.
- Facilitate rather than push. Teachers and support staff must ultimately have the need and desire to implement change.
- Build and maintain strong communication links with and among educators. Keep everyone well apprised of progress. Provide time for educators to share their successes and discuss their problems with colleagues.
- When organizing for change, work closely with all educators. No educator or educator group wants to feel left out of the process.
- Use a variety of activities to build educator curriculum teams. Examples include forming functional ad hoc committees, organizing teamwork sessions, and providing teams with opportunities to attend relevant professional conferences and workshops and bring back useful information to share with others.
- Utilize the "educators teaching educators" concept. Give educators who have developed expertise in using thematic curriculum opportunities to share their expertise with others.
- Use educator teams to conduct professional development sessions and workshops. This exemplifies the team concept.
- Offer educators specific responsibilities in the change process and opportunities to employ their professional skills in creative ways. Examples include organizing field trips to local businesses and industries, team-based curriculum development, and team teaching.
- Be sure there is support for change from the highest level of the organization (e.g., superintendent of schools). Without this support, the shift to thematic curricula may be undermined and the change may never be implemented.

curricula. This list of suggestions to assist in removing barriers is certainly not exhaustive. Experienced educators and employers who become involved with curriculum development and implementation will most likely be able to generalize from some of their past experiences to help move the process along.

Figure 2-3. Removing Barriers to Development and Implementation

- Build the curriculum on a solid foundation of basic skills.
- Emphasize the positive benefits of the curriculum as a teaching strategy, which, in turn, may make it acceptable to more educators.
- Link the curriculum with teaching approaches such as the integration of vocational and academic education that link the learning of specific skills with broader knowledge.
- Incorporate creative teaching strategies into instruction (such as using contextualized material to reinforce the learning of academic skills) that reduce conflicts and trade-offs associated with curriculum.
- Recognize that educators may be trying to accomplish more with the curriculum than with traditional instruction and, thus, allow more time to implement this reform.
- Emphasize the general nature of education and use more general categories of industries and fields at the middle school level.
- Be sure employers fully understand benefits of the curriculum so they will place realistic value on graduates.
- Show relevance for skills taught and how students can be motivated to learn in-depth concepts (academic and technical).

Available Options

When considering how thematic curricula should look in a particular school, what comes to mind? The following are four basic questions that should be answered:

1. What is the context in which the thematic curriculum is taught?
2. How may the curriculum be organized within the school and among personnel?
3. In what different ways can the curriculum be offered to students?
4. What is included in the curriculum content?

These four questions each introduce a different set of options that are available to persons who are creating thematic curricula. They include contextual options, organizational options, delivery options, and content options. Provided in Figure 2-4 are listings of the more common contextual, organizational, and delivery options associated with thematic curricula. Content options, which are often decided based on or in concert with other option decisions, are detailed in Section 6.

Figure 2-4. Contextual, Organizational, and Delivery Options for Designing Thematic Curriculum Using an All Aspects Approach*

Contextual Options
- Individual courses
- Clusters and majors
- Career academies
- Magnet schools

Organizational Options
- Traditional arrangements
- Tech Prep
- Integration
- School-to-work transition

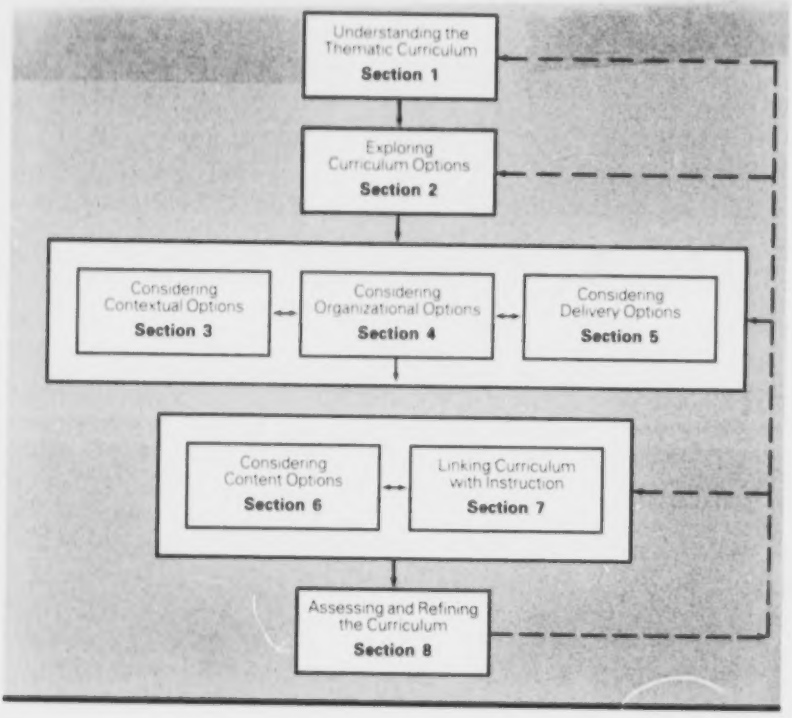
Delivery Options
- School-based enterprises
- Linkages and partnerships
- Job shadowing and mentoring
- Youth apprenticeships
- Portfolios
- Senior projects

*This is a list of representative options; it is not meant to be exhaustive.

Examining the Options

Figure 2-5 serves as an organizer for designing and implementing thematic curricula. Recognizing that curriculum development is seldom done in a step-by-step manner, the process typically begins by giving some thought to what the thematic curriculum is (Section 1), why the thematic curricula is considered to be a major educational change, and what should be done to ensure that it is successfully designed and implemented (Section 2). Next, contextual options (Section 3), organizational options (Section 4), and delivery options (Section 5) are considered. These options may be examined both individually and collectively since they are often a function of what currently exists in local school, workplace, and community settings. Persons who are already familiar with these options may choose to skip over Sections 3, 4, and 5. Contextual, organizational, and delivery considerations and preliminary decisions provide a useful foundation for determining what the thematic curriculum content will actually be (Section 6) and how it should be provided to students (Section 7). Additionally, the assessment of curriculum impact is designed and conducted (Section 8). Although shown at the bottom of Figure 2-5, assessment must begin as the curriculum is being designed and continue through the curriculum lifespan. The dashed lines in Figure 2-5 that flow from assessing impact to the other components reflect the need to feed assessment information back to each of the design and implementation components. In this way, the curriculum will continue to evolve in response to changing needs. When the various components are organized in a meaningful fashion, they have the potential to build a thematic curriculum that can affect positive and lasting change in the schools.

Figure 2-5. Designing the Thematic Curriculum from an "All Aspects" Perspective



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SECTION 3

Contextual Options

Introduction

Contextual considerations and decisions are an important aspect of thematic curriculum development. Context is the frame of reference that provides meaning to instruction (Costa, Bellanca, & Fogarty, 1992). Contextualized learning involves the development of instruction that situates learning in a specific context and provides opportunities for authentic practice (Stasz, Ramsey, Eden, DaVanzo, Farris, & Lewis, 1993). Studies have revealed that most people learn abstract or theoretical concepts more easily under contextualized or applied conditions (Ascher & Flaxman, 1993). When content, experiences, and information are provided to students within a variety of relevant contexts, students have greater potential for success. In this section, several representative contexts are described that can serve as meaningful "homes" for the thematic curriculum within the school. These descriptions are provided to assist educators and others in selecting a place or places where thematic curricula may be best situated. Four different contextual options are described: (1) individual courses, (2) clusters and majors, (3) career academies, and (4) magnet schools.

Individual Courses

In most schools, teachers are assigned to teach individual subject courses. Within these courses, themes can be incorporated into the content being taught by both academic and vocational education teachers. Academic courses can be made more relevant to students by modifying them to include various aspects of industries and fields. Teachers can incorporate broad principles and concepts related to an industry or field into their courses. For example, food service teachers can discuss the need for personal and public hygiene that prevents a disease spreading through bacterial causes. A civics course can be made relevant to students by relating local laws and regulations to zoning requirements and building codes.

Focus on a broad theme can be used as a way to motivate students and enrich the subjects being taught in a school that is organized around distinct subject matter lines. A more meaningful approach involves two or more teachers working together to make connections between their subjects. Although the courses may remain separate, teachers can collaborate by using a team teaching interdisciplinary approach to instruction. For example, in New Richmond, Wisconsin, biology and agricultural teachers exchange students for one week. The agriculture students observe and work

with the biology teacher on a tissue culturing experiment, and discuss ethical issues and economic considerations of the biotechnology industry. Biology students study water quality in the agricultural education laboratory and learn how to take and analyze samples and discuss the implications of environmental controls on local farms and businesses (Beck, Copa, & Pease, 1991).

The Phoenix, Arizona Union High School District has implemented what is termed the Fusion Project. Focus of the project is on enabling academic and vocational teachers to work together so students will have a broader exposure to their areas of study. The school district provides academic teachers with release time to work with vocational teachers on contextualizing academic and vocational course content. Mathematics and English teachers provide after-school workshops for vocational teachers and classroom aides that focus on ways to incorporate math and writing into their vocational courses (Weinbaum & Rogers, 1995).

Clusters and Majors

Clusters and majors constitute another context for the thematic curriculum. A number of schools have organized their curricula around clusters and majors that focus on related occupations, interdisciplinary themes, a particular industry or field, or around careers requiring postsecondary education. In Oregon, for example, a certificate of advanced mastery learning, organized around six broad clusters or focus areas that include arts and communication, business and management, health services, human resources, industrial and engineering systems, and natural resource systems, is being advocated for schools (Oregon State Board of Education, 1992).

Other schools have developed programs based on clusters and majors such as health care, building construction, materials fabrication, and graphic communications. In some schools, programs focus on preparing students to enter the workforce upon graduation, while others provide a technical/

professional series of career clusters that meet the needs of work-bound as well as college-bound students. The cluster concept is one way schools can provide opportunities for students from various backgrounds, skill levels, and interests to enroll in common courses and provide teachers from different subject areas with opportunities to collaborate in providing instruction.

Clusters provide excellent opportunities for students to explore careers and see their relationships, and to become knowledgeable about broad theme areas such as industries or fields. There are many examples of cluster programs in high schools throughout the nation. One such example is Dauphin County Technical School located in Harrisburg, Pennsylvania, which serves six school districts. Education is organized around four career clusters. These include technical, communication and transportation, construction, and service clusters. Students enter an occupational exploratory program in the ninth grade and select a specific career cluster for the next year. Teams of academic and vocational education instructors in the cluster are assigned to work with students for the next three years. Instructional team members work together to integrate their courses around the career cluster theme. Students are involved in a variety of projects both within the school and across the local community. In the service cluster, for example, law enforcement and social studies teachers work with students to design and estimate the cost of a home security system. In social studies courses, students apply economic principles to applied areas such as legal regulations, labor costs, and profit margins.

Career Academies

The career academy is typically organized around a broad career theme (e.g., an industry or field) and is operated as a school-within-a-school. Academy instruction is incorporated around the functions associated with the particular theme. Examples of broad themes include finance, health, environmental science, and manufacturing. Students who enroll in a career academy are grouped with a team of teachers for a three- to four-year program. These students may be actively involved in team learning projects where they gain and apply knowledge and skills to solve theme-based problems or activities. An important aspect of the career academy is providing students with work-based learning opportunities through the development of business, industry, and community partnerships. Examples of student opportunities include summer internships, apprenticeships, and mentoring fellowships with local employers. Many career academies are designed to provide their graduates with marketable technical expertise as well as the academic expertise needed to enroll in postsecondary education (Stern, Raby, & Dayton, 1992).

One of the first academies in the country was established in 1969 in Philadelphia, Pennsylvania. It became a model for adoption for other schools in the city as well as across the country. Career academies may now be found in numerous locations throughout the United States. The National Academy Foundation (NAF) (1991), an organization supporting school academy alliances, reported that in 1994 almost 8,000 students in 23 states participated in their affiliated programs.

The Academy of Finance at Lake Clifton-Eastern High School in Baltimore, Maryland, serves as an example of the way academies can be organized. Located in an urban, comprehensive high school, the academy enrolls 200 9th- through 12th-grade students in academic and finance-related courses. These students are provided with hands-on instruction for employment as well as further education in the area of banking and finance (Pauly et al., 1995). The finance courses address financial career exploration, computer science, economics and finance, and banking and credit. During the school year, students are assigned to business mentors and participate in job shadowing experiences. During their mentoring experiences, students learn about the business organization as well as worker-specific skills and knowledge. Field trips to local businesses and the Federal Reserve Bank expose students to a wide range of financial career opportunities and work environments. During the summer between the 11th and 12th grades, academy students participate in nine-week paid internships to develop generic work-readiness and finance-related skills.

Another example is the Health and Bioscience Academy at Oakland Technical High School in Oakland, California. This academy aims to reduce dropouts among at-risk and disadvantaged students. Students take intensive courses in biology, physiology, chemistry, and mathematics along with English, social studies, health occupations, and computer applications. Community involvement is extensive, with sponsored mentors supervising hundreds of student community-service hours in local health care facilities.

The summer before their senior year, students are placed in health-related internships. Students also complete senior projects that focus on researching major health-related problems. Each completed project is reviewed by a health industry mentor. Articulation agreements with local community colleges allow students to receive advanced credit in allied health and biotechnology as part of their high school studies. Related courses enable students to pursue university studies and/or immediately enter the workplace (Clark, de Leeuw, Flynn, & Yates, 1994).

Magnet Schools

Like career academies, magnet school curricula are organized around broad themes. However, magnet schools tend to be organized on a schoolwide basis rather than as a school-within-a-school. Many large urban school districts have developed magnet schools as strategies for integrating the racial composition of large metropolitan areas. In the United States, the number of magnet schools and students attending these schools has doubled in the last decade. In school districts with magnet schools, 15% of the students, or approximately 1.2 million students, attend these schools (National Science Teachers Association [NSTA], 1994).

Magnet schools provide an excellent opportunity to incorporate broad themes into the curriculum. These themes can provide a variety of opportunities for students to learn about functional areas such as planning, organizing, processing, marketing, and distribution. The interaction of subjects and interdisciplinary instruction strategies allows teachers and students to work in collaborative teams to apply knowledge and skills, find solutions to real-life problems, and participate in simulated work settings. The outcomes of these experiences may include learning how to communicate in written and oral form, and working as a team member.

The Chicago High School for Agricultural Sciences is an example of a magnet school organized around an agricultural science theme. Chicago is well-known for its food-processing and distribution industries, and members of the business community are active members of the school's curriculum advisory committees. Each student enrolled in the school is expected to complete a rigorous set of studies, which includes an emphasis on life sciences and laboratory applications. Application of skills and knowledge is accomplished through summer internships provided in the laboratories, offices, and processing plants of the agricultural-based industries located in the area. Students also learn about agricultural science through project participation. Project opportunities range from researching a new process or product to marketing and distribution of food products throughout the country.

In New York City, magnet schools have been in operation for a number of years. The New York School for the Performing Arts is a well-known

example of a magnet school preparing students for a wide range of careers in film, television, and theatre arts. The High School of Fashion Industries, located in the garment district of New York, prepares students for careers in many aspects of fashion design and merchandising. A business sponsor, the Liz Claiborne Foundation, has adopted the school and provides funding for student scholarships and special courses. Additional industry support is provided through a career day for students and a weekly mentoring program. Cooperative learning projects are used to integrate fashion design and merchandising skills with other subject area content. These integrated projects not only stimulate student interest, motivation, and learning across subjects, but they also provide a team focus to problem-solving experiences reflective of high performance workplaces. The application of skills and knowledge to solving problems in collaborative team settings is an important skill for students to learn (Pauly et al., 1995).

The Addison Aerospace and Science Magnet School, a middle school in Roanoke, Virginia, has been organized around a space science and technology theme. Students have the opportunity to learn and apply knowledge around careers and activities in the broad field of aeronautics needed for travel, research, and communications between earth and outer space. A full-scale laboratory simulating a NASA control room is used by students to plan for, conduct, and monitor a space vehicle launch. Students learn various aspects of the space field by planning and coordinating functions associated with launching a space vehicle.

Contextual Options: Strengths and Limitations

The practical aspects of contextual learning may lead educators to ignore the fact that careful implementation is needed. Some of these options imply major changes in school organization, while others do not. Contextual options can serve a wide range of students and provide many opportunities for broad understanding of a field. Each contextual option utilizes a broad theme to meet the students' needs.

The individual course approach is a convenient way to incorporate broad themes into school curricula. The individual teacher is responsible for determining and delivering instruction and can readily incorporate these themes into his or her subject. Teachers can take a thematic approach to developing activities, projects, and so on, that address specific concepts, skills, and/or capacities. A major drawback is the isolation of instruction which discourages teacher interaction and minimizes curriculum integration. Fortunately, the incorporation of themes into individual courses may provide students with opportunities to apply principles and concepts learned in other courses.

The cluster concept requires teams of teachers to collaborate extensively in developing and implementing content around broad themes. Teachers

may arrange their courses so that similar topics coincide with each other. Similar concepts from two or more disciplines may be combined into comprehensive projects, units, or courses. Clustering arrangements enable schools to provide students with a wider selection of study areas and opportunities for curriculum integration. However, when academic courses are offered apart from the cluster, or non-core subject teachers are excluded from the cluster, the integration of curriculum becomes difficult. Community, business, and industry relationships developed to support each cluster can assist the school in providing students with realistic, up-to-date knowledge and skills. On the other hand, resources for establishing and monitoring linkages between employers and community representatives and quality work programs often do not exist.

A major advantage of the career academy is the opportunity to prepare students for employment and advanced study in a broad career field. Academies address the continuing issues of the noncontextualization and fragmentation of learning. Career academies require intensive collaboration among teachers to plan, coordinate, and incorporate the curriculum around a career theme. To be successfully implemented, academies require effective administrative leadership and community support. Community and workplace efforts to provide real-world activities and experiences through job shadowing and internships are critical. Additional concerns may be the teachers' acceptance of integrated or thematic curriculum and their abilities to sufficiently address both the breadth and the depth of the content. Teachers may not have had adequate exposure to or instruction in interdisciplinary processes. Administrators must also recognize and support innovative ways of staffing, scheduling, and allocating resources.

Magnet schools require the restructuring of an entire school around a theme. Thus, magnet school development occurs in increments over an extended time period. Theme content and concepts can become an integral part of this schoolwide effort if intensive planning and instructional innovation occur. Since magnet schools attract and serve a wide variety of students in an environment based on active learning, it is only natural that thematic curricula be used. Again, teachers may need assistance to learn to successfully mesh core subject knowledge with technical knowledge. Teachers must also develop and maintain direct knowledge of the modern workplace and continuously incorporate this knowledge across the curriculum.

Summary

The contexts for thematic curricula vary from simple to complex. Themes can be found within the context of courses taught by individual academic or vocational teachers, or can occur in restructured school environments such as clusters and majors, career academies, and magnet schools. Each

contextual option has strengths and limitations. It is, therefore, important to consider these factors when establishing the thematic curriculum. Teachers and administrators need to carefully discuss the various contextual options, determine which of them are most beneficial, and determine if resources are available to implement them as early as possible in the curriculum design process.

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SECTION 4

Organizational Options

Introduction

As the thematic curriculum is being designed, it is important to consider ways that organizational arrangements can be used to improve curriculum and instructional effectiveness. Evidence exists that organizational options can contribute to the effective delivery of instruction, however, some options may be more effective in one educational setting and less effective in another. Educators thus have the responsibility to decide which option or combination of options will best serve their specific locale and educational system. As these organizational options are being examined, educators should consider how the thematic curriculum might be employed to make good options even better. Conversely, persons who are creating thematic curricula should determine which organizational arrangements have potential to improve curriculum and instructional quality. In this section, four of the more common options are described. They include traditional arrangements, Tech Prep, the integration of vocational and academic education, and school-to-work transition. Since so much has already been written about these educational reforms, persons who need additional information about these options should consult the references listed at the end of this section.

Traditional Arrangements

Traditional arrangements refer to the ways school curricula, programs, and courses have been organized since the early 1900s. In these arrangements, teachers may make little or no reference to other subjects and have little contact with teachers in other subject areas. Typically, teachers who teach similar subjects are members of the same department. This contributes to the isolation of teachers from each other. Teachers who teach vocational subjects are likely to be organized and housed separately from teachers of other subjects. In spite of these restrictions, the thematic curriculum can be incorporated into traditional educational settings.

According to Hoachlander (1994), vocational and academic teachers implementing an industry- [or field-] based curriculum must modify their roles in three important ways. First, teachers must view their roles as imparting understanding of and experience in an industry [or field] in addition to their specialized area. Second, teachers must develop both an academic specialization and an industry [or field] specialization. And third,

teachers must learn to develop their curricula and teaching methods to address real issues in their industry [or field] specialization.

Teaching within subject-oriented boundaries, teachers should have little difficulty bringing their students into workplaces and the community so they can link school-based learning with what occurs in the real world. Also, since academic and vocational subjects can be taught using references to broad themes such as industries and businesses, teachers who have applied knowledge about these areas can include relevant content in their instruction. Additionally, since academic and vocational teachers can make references to each others' subjects while teaching their students, many opportunities exist to extend instruction beyond traditional subject boundaries.

Tech Prep

Tech Prep has been defined as "programs that link the last two years of high school with the first two years of college or technical education in specific occupational areas. Tech Prep programs typically have a strong applied academics focus and limited work experience components" (Ryan & Imel, 1996, p. 5). The Tech Prep program has an articulation component that facilitates placement in employment or further education, which may include a two-year or four-year degree (Thuli, 1996). The articulation process that links high school and college may include a competency-based, technical curriculum in which competencies are taught without duplication. Technical theory and real-world practice are provided in applied academic and vocational specialty classes and work settings.

Incorporated into most Tech Prep programs are direct involvement and collaboration from business and industry representatives in the development of outcome-based curricula with applied performance standards (Neilsen, Dunlap, & Matthews, 1993). The focus of Tech Prep programs available to students may range from high tech to low tech. High tech programs tend to require more rigorous levels of mathematics and science; whereas, low tech programs tend to require less rigorous levels.

Thematic curricula and Tech Prep can be linked together to form powerful and effective combinations. For example, it may be more beneficial to design Tech Prep programs that prepare students for employment in broad industries and fields than for narrowly focused jobs and occupations. Within the thematic framework, instruction may be organized so students learn about the history and economics of an industry or field they are preparing to enter. The functions and economic contributions of the industry or field to local, state, regional, national, and global economies can also be studied. Students can learn about the evolution of the industry or field and forces that influenced its development, as well as forces that are likely to shape future development. Students may then verify their exposure to these

aspects of the industry or field during their supervised workplace experiences.

Course content may include the technological principles that drive production processes; health, safety, and environmental issues; technical skills and knowledge; and government regulations. By completing a comprehensive Tech Prep program that is grounded in a broad theme, students can learn much more about the breadth of an industry or field. Ultimately, employers of these graduates should be pleased to discover that their new workers truly comprehend the breadth of the industry or field in which they work.

Integration

Integration involves organization of the best curriculum and teaching practices of academic and vocational education into a single "integrated" experience (Bodilly, Ramsey, Stasz, & Eden, 1992). The focus of integration is on enriching school subjects to enhance the contributions of academic and vocational subjects to education of all students. It requires linking the content of academic and vocational curricula and developing new strategies and methods to align, sequence, and mutually reinforce academic and vocational education studies.

Teachers who have shifted to integrated instruction have found that it required them to move away from traditional teaching approaches and embrace new instructional models. The integration process can be more effectively implemented using one or more of the models identified by Grubb, Davis, Lum, Plihal, and Morgaine (1991). As Grubb et al. note, no single integration model is suitable for every school, and extensive variation exists

within each model. Model choice and implementation efforts depend on many factors, including existing academic and vocational offerings, teacher and student interests and capabilities, availability of resources, and the extent to which administrative support exists.

According to Grubb et al. (1991), integration can be established by having academic and vocational teachers work together to incorporate academic content into vocational programs and vocational content into academic programs. Teachers may participate in *curriculum alignment* (which approximates the first four models discussed by Grubb et al.), where both academic and vocational courses are modified over time and coordinated across subjects. Academic subjects are taught using related vocational materials, and academic teachers modify their subjects to align with the types of workplaces students are preparing to enter. Academic studies organized using this model are termed "applied academic subjects." In addition, vocational teachers develop programs and courses with more relevant academic content and rigor. Curriculum alignment involves exchanging information, sharing issues and skills, and coordinating topics within and between academic and vocational courses. Teachers can thus include complementary content within their regular teaching time frames. Ultimately, curriculum alignment can serve to organize courses so students experience a connected, mutually reinforcing curriculum (Grubb et al., 1991).

"Curriculum alignment involves exchanging information, sharing issues and skills, and coordinating topics within and between academic and vocational courses. . . . Ultimately, curriculum alignment can serve to organize courses so students experience a connected, mutually reinforcing curriculum."

The *project* model can help in further facilitating integration of vocational and academic subjects. In this model, the curriculum is organized around student projects that draw from skills and information learned in different classes and through various personal experiences. In some cases, students may replace their electives with the completion of a comprehensive project (for further information about senior projects, see Section 5). Projects commonly require the production of written presentations, oral presentations, and physical representations. The *project* model emphasizes individualization, independent work skills, presentation skills, problem-solving skills, research skills, and creativity.

Projects are sometimes organized based on teachers' on-the-job experiences. For example, while working as a technician for a plumbing, heating, and air company, a vocational teacher who was employed at an area vocational school was required to work with customers over the phone. The teacher felt this was a valuable skill for students to learn. With the help of a vocational-technical coordinator, the teacher assigned students different workplace scenarios, having them role-play a company representative and customer. Students were instructed on communication skills such as business etiquette, tone of voice, and language of the field. In addition, they were required to orally explain the operation of an air conditioning or heating system (Gladdis & Kline, 1995).

Several additional integration models may be linked with the thematic curriculum. They are discussed in Section 3. Models include the *academy* or school-within-a-school, the *career cluster* or career path, and the *magnet school*. Each has the potential to function in concert with the thematic curriculum and improve teaching and learning in the schools and the workplace. However, regardless of the model or models chosen, integration design must take into consideration factors such as the type of school, the students' characteristics, and the different subjects to be integrated (Schmidt, Finch, & Faulkner, 1992). In some school settings, teachers have been very successful at implementing integration and continue to grow from the experience. In other settings, teachers have struggled with integration and have yet to move very far with it. This situation tends to exist because integration requires the development of "a trusting, respectful, supportive, truly collaborative relationship among those involved in the implementation (Winitzky, Sheridan, Crow, Welch, & Kennedy, 1995, p. 111). Integration implementation calls for a coherent form of established cooperation and collaboration (Holt, 1993). In other words, as with thematic curriculum implementation, educators must be able to work as members of professional teams and be given time when they can truly cooperate and collaborate with each other. If this does not occur, both integration and thematic curricula may never achieve their potential.

School-to-Work Transition

Although school-to-work transition has existed for some time, it has only been within the last few years that national emphasis has been placed on this area. Recent legislation, termed the School-to-Work Opportunities Act of 1994 (Brustein & Mahler, 1994), has aided in making school-to-work transition more understandable and acceptable to the general public. In order to receive funding, programs are required to include three components: (1) school-based learning, (2) work-based learning, and (3) connecting activities that link the school- and work-based activities in meaningful ways (Finch, 1997). School-to-work transition can include

virtually all of the options described in this guide; however, these options are envisioned as being organized to form a complete system in which school- and work-based learning are integrated, vocational and academic education are combined, and secondary and postsecondary education are linked (Ryan & Imel, 1996).

School-based learning may be provided through courses, clusters, majors, career academies, magnets, Tech Prep, integration, portfolios, projects, enterprises, themes, and other arrangements. Work-based learning may include arrangements such as job shadowing, mentoring, youth apprenticeships, cooperative education, on-the-job training, and community service learning (Hoerner & Wehrley, 1995)). Linking activities require that educators collaborate with people from business, industry, and the community to ensure that students are provided with learning experiences that connect school- and work-based learning in meaningful ways. Examples of ways this linking may occur include formal partnerships; advisory committees; collaboration with business, industry, and community organizations; and local groups such as the Chamber of Commerce. Strategies that may be used to improve school-based learning, work-based learning, and school and workplace linkages for learning are described in Section 7.

Goldberger and Kasiz (1996) highlight several important benefits of work-based learning:

- provides an authentic laboratory for developing and exercising complex problem-solving skills
- provides a reality check about different types of work settings and work roles
- develops an appreciation for the importance of learning as an aspect of what work is about
- assists in the development of student contacts with employers, mentors, and career pathways, which provide support and possible job connections.

However, it must be noted that for work-based learning to succeed with students it should be coordinated with what is taught in the schools. This is where the thematic curriculum can have positive and lasting impact since it provides learning benefits to students that work-based learning alone cannot provide. In effect, curriculum themes can contribute to the linking process by engaging students in the school-related study of broad industries or fields as part of their regular studies, and then assisting students in verifying theme-related studies when they participate in work-based learning.

Summary

Implementing the thematic curriculum involves organizing content and teaching strategies in meaningful ways to address and meet students' learning needs. One way of responding to this need is by combining thematic curricula with different organizational options. Themes can be organized and taught within traditional school arrangements, with individual teachers making connections between their subjects and the world of work. Teachers can also organize thematic curricula in concert with educational reform initiatives such as integration, Tech Prep, and school-to-work transition. School- and work-based learning experiences play a significant role in students' intellectual and social development and their preparation for life and living. Whether organized in conjunction with one or more of the organizational options discussed in this section, the thematic curriculum cannot help but become strengthened in the process.

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SECTION 5

Delivery Options

Introduction

Educators must not overlook opportunities that exist to build useful delivery approaches such as school-based enterprises, mentoring, and portfolios into the thematic curriculum. These delivery approaches should not be used one time in a single instructional setting, but may be used as often as they can have positive impact on student learning. Persons responsible for creating the thematic curriculum must consider, therefore, which approaches can strengthen the curriculum and next determine how much each different approach will cost to implement and maintain in relation to its potential benefits. From this consideration should emerge a list of the options and where they will fit into the curriculum.

The thematic curriculum can be logically linked to delivery options because it has much in common with a number of delivery approaches, some that focus on school-based learning and others that focus on work-based learning. Other approaches can be used in conjunction with the curriculum to help link the school and the workplace. Delivery approaches described in this section include school-based enterprises, linkages, partnerships, job shadowing, mentoring, youth apprenticeships, portfolios, and senior projects. Each has the potential to offer students more relevant learning experiences as they study about and explore broad curriculum themes.

School-Based Enterprises

School-based enterprises provide students with opportunities for realistic workplace learning in the school environment. School-based enterprises may be defined as any activities through which students produce goods and services that have utility, and that can be sold to other people (Stern, Stone, Hopkins, McMillion, & Crain, 1994b). Typical school-based enterprises may include a day care center, an automotive service laboratory, or a cosmetology center. Other examples that are less frequently found in schools include home-building, restaurant management, retail store management, automobile sales, crop-raising and livestock production, book and periodical publication, environmental quality and energy conservation, reconstruction of local historical landmarks, and small-scale manufacturing (Stern et al., 1994b).

When school-based enterprises are established, students should be active participants in the process. Decisions must be made about the organization

and vision of the enterprise, the incorporation of policies, and what products and/or services to provide. Early on, students must be involved in marketing research which considers customers, goods, services, and sources of raw materials. Students should also have extensive involvement with financial and management aspects of the enterprise such as budgeting, conducting inventories, setting appropriate prices for goods and services, and locating suitable facilities within or near the school. Care should be taken not to establish an enterprise that will compete with taxpayers' businesses in the same locality, since taxpayers' money may be invested in the school-based enterprises (Stern et al., 1994b). Although school staff members are ultimately responsible for establishing the enterprise, student participation in this process enables them to experience how a business or industry is established. Participation also encourages students to develop a holistic view of the enterprise, rather than viewing it as a specific job or set of tasks. And finally, the enterprise can serve as a useful vehicle for educating students about a broad theme such as an industry or field.

One illustration of student involvement in an enterprise may be seen at Robert E. Lee High School in Staunton, Virginia, where students under faculty supervision developed an interdepartmental business enterprise called the Balloon Shop. Orders for helium balloons and bouquet arrangements are taken and filled daily. Students apply the strategic planning skills required to open a new business such as marketing research, pricing, merchandising, promotion, customer services, human resource development, supervisory skills, and product management. Emphasis is also placed on developing work-related skills such as human relations with customers and colleagues, communication skills, problem-solving, teamwork, producing a quality product, selling, and product knowledge. In addition, basic employability

skills acquired include being on time, maintaining an orderly work area, following written and oral directions, accepting instructions from management, exhibiting initiative, and controlling one's behavior. The Balloon Shop school-based enterprise provides unlimited opportunities for students to become better prepared for both life and entering the workforce (Asselin & Mooney, 1996).

Providing students with exposure to broad themes such as industries and fields using school-based enterprises may require teachers to have more than just a bit of knowledge about the workplace. Actual long-term workplace experience and exposure to related industries or fields can help teachers serve effectively as adult-worker role-models. This type of interactive, hands-on professional development provides educators with important knowledge and skills that can make the difference between success and failure of a school-based enterprise (Jordan, 1996).

One example of how educators can learn more about the workplace may be found in the Cincinnati, Ohio area. The Great Oaks Institute of Technology and Career Development and the University of Cincinnati sponsor a program that places K-12 teachers and administrators in local businesses for one week. The purpose of the program is for educators to better understand the local economy and employers' requirements. Educators participate in sessions on economics, decisionmaking, career trends, and school-to-work issues. Three-and-a-half day job shadowing experiences are provided for each participant. Educators may focus their experience in one workplace or divide their time between several employers. Businesses involved in the program range from small, family-owned companies to large manufacturers. As a culminating activity, educators create activities to help their students understand workplace realities (Jordan, 1996).

Often when educators are exposed to the workplace, the experience can serve as a starting point for curriculum change. In Philadelphia, teams of educators who work in the city's career academies have participated in teacher internships. Educator teams have explored businesses and industries through job shadowing experiences, interviews with human resource personnel, and team-building exercises. After completing these experiences, educators discuss what they have learned in the workplace and decide what aspects of their experiences might be incorporated into their academy curricula (Rahn, 1996). These two professional development examples exemplify the ways that teachers can learn more about an enterprise and thereby be better prepared to guide students through its establishment and operation.

Linkages and Partnerships

Another important contributor to the thematic curriculum's success consists of linkages and partnerships between the school and local industries, businesses, and the community. Linkages and partnerships are quite similar in that they both involve the school or school representatives in establishing meaningful connections with workplace and community representatives. Their differences are typically of an informal versus formal nature. Linkages tend to be more informal, whereas, partnerships are more often formalized through some sort of official agreement. Take for example, a drafting/CAD teacher who is employed each summer by a manufacturing company. Through informal connections with this company, the teacher is able to access company employees that can be guest speakers in her classes and serve on the drafting/CAD program advisory committee. Through periodic contacts with the company's personnel manager, she also has informal access to student internship and graduate employment opportunities. A partnership, on the other hand, might be established between a school and an employer to share equipment or between a high school and a community college to formalize collaboration for a Tech Prep program.

Figure 5-1 Examples of Benefits to the School Through Linkages and Partnerships

- Job shadowing and internship opportunities for students
- Employment opportunities for graduates
- Summer employment opportunities for teachers
- Donations of equipment, materials, and employee time
- Access to guest speakers, judges, and evaluators
- Access to employer equipment and services
- Access to business and industry technical workshops and conferences
- Improved communication with employers
- A better understanding of employers' expectations

In fact, the opportunities for linkages and partnerships are almost limitless. Provided in Figure 5-1 are examples of the many benefits that can accrue for schools through the establishment of linkages and partnerships.

It must be recognized that linkages and partnerships are much like a two-way street. Both the school and the workplace expect to gain from their connections with each other. If school officials decide to establish a linkage or partnership without giving consideration to how a business or industry might benefit, they have not really considered what linkers and partners do. Realistically, linkers and partners must participate, collaborate, share, and gain from the experience. Otherwise, an unbalanced connection will be created. Listed in Figure 5-2 are several benefits that may accrue for employers who link and partner with schools. These are

just a sampling of the many benefits employers may gain through their associations with schools.

Figure 5-2. Examples of Benefits to Employers Through Linkages and Partnerships

- Access to program students and graduates
- Technical assistance from school faculty members
- Improved communication with educators
- A better understanding of educators' expectations
- Access to school classroom and laboratory use for employee training
- Opportunities for employees to volunteer their services to the schools
- An increase in the company's visibility in the community
- Solutions to business problems/creation of new or improved products

Job Shadowing and Mentoring

Job shadowing and mentoring are among the most powerful work-based learning experiences available to students. Job shadowing places less responsibility on the adult worker and more on the student. When a student has a job shadowing experience, he or she closely observes one or more workers performing regular duties and tasks in the actual work environment. Opportunities are provided for students to ask related questions as long as they do not disrupt adult workers' normal work processes. Students are usually required to note different aspects of the workers' activities and performance so they can discuss these areas during debriefing meetings with other students and teachers. With proper direction from teachers, students should be able to easily relate classroom learning to their job shadowing experiences.

One example of job shadowing may be found at the Rindge School for Technical Arts in Cambridge, Massachusetts, where each student participates in two, three-hour job shadowing experiences per quarter. A "Job Shadow Fair" takes place each quarter, with participating employers presenting information about job shadowing opportunities. After students choose their job shadowing experiences, they are required to arrange an employer interview and obtain approved transportation to the site. They must take notes at the job site and prepare oral and written reports which are presented in class (Nielsen Andrew, 1996).

Mentoring may be defined as an organized, work-related relationship between an experienced worker and a learner, in which the worker assigns and monitors the learner's work activities and offers support and guidance. Support and guidance is particularly important when a young person is being mentored because the young learner may need assistance when he or she "goes through a difficult period, enters a new area of experience, takes on important tasks, or attempts to correct earlier mistakes" (Stern, Finkelstein, Stone, Latting, & Dornsife, 1994a, p. 56). Mentoring extends beyond preparation for life and earning a living. Successful mentoring

depends on having experienced adults with an interest in the development of 'whole students.' This means the mentor should not take responsibilities lightly. Mentoring tasks can be time consuming and just plain hard work, especially when young people are the ones being mentored.

Teacher visits with workplace mentors can help them to help students relate their work experiences to a broad industry or business theme and to classroom learning. Mentors should, therefore, take time to show students various departments in the workplace and explain how each department links, functions, and contributes to the overall operation of the industry or business. Students can also observe mentors at work, noting activities and comments as journal entries.

Job shadowing and mentoring experiences can expose students to a range of theme-related functions, concerns, issues, and technological knowledge and skills. Whether a student is preparing to enter the workplace, preparing for further education, or both, job shadowing and mentoring experiences provide exposure and learning that is difficult if not impossible to duplicate in regular school settings.

Youth Apprenticeships

Apprenticeship has existed in the United States for hundreds of years. In fact, formal apprenticeship programs predated passage of the Declaration of Independence. Apprenticeship has survived over the years and continues to be a useful way of preparing people for employment; however, it has been overshadowed by school-based occupational programs provided by high schools and community and technical colleges. During the past decade, concern began to be raised about the capacity of U.S. workers to compete in the global workplace. Some of this concern eventually led to exploration of how other countries were preparing their workforce. Study results showed

that apprenticeship was the central focus of workforce preparation in a number of European countries. Soon, several pilot apprenticeship programs were initiated in the U.S.; however, these programs were termed youth apprenticeship since they enrolled persons who were still students in school.

Youth apprenticeship builds on the legacy of traditional apprenticeship; however, it has some rather unique characteristics:

- coordination among schools, employers, labor, and government
- integration of school-based and work-based learning
- certification of graduates for academic and occupational skills mastery
- preparation of students for high skill, high wage careers that require less than a bachelor's degree (Hoerner & Wehrley, 1995)

In youth apprenticeship, the workplace is viewed as a learning place, not simply an environment where students gain practical experience and specific job skills (Bailey & Merritt, 1993). Skilled craftspersons provide on-the-job training, monitor students' progress, act as resources to students during their work experience, and provide them with performance feedback. Apprentices typically rotate through a systematic schedule of varied assignments at the work site, and have a gradual increase in job responsibilities. Many youth apprentices are paid for their work. For example, in Pennsylvania, youth apprentices spend two days each week on the job beginning in 11th grade and three days per week in 12th grade. Participants receive wages that gradually increase during participation. In Maine, apprentices work at the job site for 30 weeks per year in the 11th and 12th grade, and 34 weeks in grade 13. A year-round stipend with annual increases is provided (Reisner, McNeil, Adelman, Kulick, Hallock, & Leighton, 1993).

Youth apprenticeship and the thematic curriculum are actually quite compatible. For example, youth apprenticeship links school-based and work-based learning, a combination that thematic curriculum proponents view as a powerful instructional approach. Additionally, youth apprentices are exposed to a broad range of workplace experiences which align reasonably well with the thematic curriculum view that students should have a theme-wide (e.g., industry or field) focus to their studies. Will youth apprenticeship thrive and continue to grow? Only time will tell, but for now it is clearly a useful option that links closely with the thematic curriculum's philosophy and operation.

Portfolios and Senior Projects

Portfolios and senior projects may be implemented in almost any school or program. However, portfolios and senior projects that are connected with thematic curricula have the potential to link students' school- and work-based learning in very positive and meaningful ways.

Portfolios are certainly not new to either education or the workplace. Both art and architecture students are often required to prepare portfolios that include the work they have completed in different courses. When these same students are seeking employment, their prospective employers may ask to see portfolios containing samples of their work. Likewise, persons who are applying for positions in broadcasting are often required to submit portfolios containing tapes highlighting their broadcasting experience. Student portfolios typically include samples or a complete set of work completed during an extended period of time such as a school year, a semester, or a grading period. Although the traditional portfolio is flat, students should not be restricted to this format—especially if they are studying in areas where bulky items are created.

And what are some of the benefits associated with student portfolios? The following are a few examples:

- Students are provided with experience in organizing and displaying work they have completed.
- Students learn how to prepare their completed work so it can be shared with prospective employers.
- Students learn how to obtain employment by "marketing" their work experiences.
- Students can provide clear evidence that they have mastered specified program objectives.

Benefits that portfolios have for students thus extend beyond determining if they have completed certain classroom objectives. Students who have gained expertise with portfolio preparation are in a much better position to "sell" themselves to employers. Obviously, a traditional résumé does not communicate what a student has accomplished in school. But a résumé plus a properly prepared portfolio can accurately communicate these accomplishments.

Many teachers include some sort of project requirement in their courses. In concept, the senior project is not much different from the course requirement. However, it differs markedly in scope and emphasis. First, the student completes his or her senior project during the greater part of the senior year in high school. Second, the student is guided and evaluated by a panel that is typically composed of representatives from different academic and vocational teaching areas as well as business, industry,

and/or community representatives. This panel approves the project proposal and evaluates project completion via an extensive written report prepared by the student and an illustrated oral report given by the student. Third, the project typically involves some sort of link between the school and businesses, industries, and/or the community. And fourth, satisfactory completion of the project is usually required for graduation.

With all the work that goes into a project of this sort, what sorts of benefits are derived? Typical benefits include the following:

- Useful business, industry, and/or community products are produced or services are rendered.
- Students are able to combine and apply the knowledge and skills they have already learned in school and gain additional expertise and higher order learning skills through project planning and implementation.
- Through project completion, students learn about the meaningful links that exist between school studies and the real world.

There are certainly other benefits that may accrue through the completion of senior projects. Examples of benefits include the development of student expertise in team building, leading, coordinating, planning, and evaluating. Because the senior project can develop students in more comprehensive ways than is usually accomplished in individual classrooms, it is indeed an option that should be considered for inclusion in any thematic curriculum.

Summary

As the thematic curriculum is being planned, it is important to decide which delivery options should be included and which should not. Since inclusion of delivery options in the curriculum is largely a function of the locality, the extent of local support, and other related factors, options that are chosen may need to be tailored to local education and workplace constraints. Linkages, partnerships, job shadowing, mentoring, youth apprenticeship, portfolios, and senior projects all have the potential to link learning in the school with learning in the workplace. However, their linking can occur in different ways. For example, students' job shadowing and mentoring experiences can cause them to appreciate their school studies more and give them greater motivation to study and learn. Although portfolios and senior projects tend to be supervised by educators, involvement of workplace representatives in the assessment of these portfolios and projects can serve as a valuable link between education and the workplace. Educators who recognize the potential that delivery options have when they are combined with the thematic curriculum, and follow up on this by deciding which options should be included in their schools, will not be disappointed. Each delivery option has the potential to serve as a powerful intervention when it is used with students.

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SECTION 6

Content Options

Introduction

Traditionally, content has been considered as curriculum development's primary focus. Contemporary views of curriculum have not diminished content's importance in the curriculum building process; however, content is currently seen as having a shared role in determining what the curriculum should be. As with many other curricula, the thematic curriculum is developed giving full consideration to how potential content aligns with contextual, organizational, and delivery decisions (see Sections 3, 4, and 5). In this section, ways that thematic curriculum content may be identified and organized are described. The process begins by documenting school, workplace, and community needs and potential contributions. This is followed by identifying and selecting curriculum content. Selected content is then organized and integrated in ways that best serve students' needs.

Documenting Needs

If the thematic curriculum is to have relevance, curriculum content should be closely aligned with the school, the workplace, and the community. But why is this so important? Just as mathematics and English course content are often based on what students need to prepare them for further education and to function in the real world, thematic curriculum content should be relevant to students' current and future educational and career needs. Content should also link in meaningful ways with the community and the workplace. For example, it is important to document potential opportunities to utilize the workplace and the community as school partners. Since the thematic curriculum places emphasis on a broad content theme (e.g., industry, field, career) it is important to determine

- why the school and its staff feel the need to create a thematic curriculum.
- which students the curriculum will serve and how it will serve them.
- what businesses, industries, and fields are represented by area employers.
- which employers and community organizations and agencies in the area may be able to contribute to the curriculum.
- what additional theme-related educational and workplace opportunities exist in the local area.

Internal and external scanning, which are used in the strategic planning process, can be easily applied to curriculum needs assessment (Herman,

1989). Internal scanning consists of gathering relevant information from people and other sources within the organization (school and school district); whereas, external scanning refers to gathering information from outside the organization (businesses, industries, and the community). Gathering this information can be as simple or as complex as time and resources permit. However, the process should seek answers to key questions about the school, the workplace, and the community.

The School

Documenting why the school and its staff intend to create a thematic curriculum is basic to the development process since it allows intentions to be discussed, debated, and ultimately documented. These actions—especially documentation—ensure that school staff who are involved with the curriculum understand what they will be getting into and why. Determining which students the curriculum will serve is important since this decision has direct impact on the curriculum content and expectations. For example, a thematic curriculum designed for students who plan to attend universities right after high school might be quite different from one that will serve students who plan to attend universities after they have been employed for a few years. When determining which student groups the curriculum will serve, several questions may serve as focal points (see Figure 6-1).

Answers to these questions should reveal what constitutes the curriculum's target population; that is, which students the curriculum will be designed to serve. However, the answers can also assist in deciding what marketing may be needed to reach these students so they are encouraged to enroll.

Figure 6-1. Determining Who the Curriculum Will Serve

- What defining characteristics do the potential student enrollees have? (e.g., college and university bound, interest in the transportation field, current enrollment in middle school career cluster studies)
- At what grade level(s) might students be enrolled in the thematic curriculum? This information has implications for determining students' maturity levels and educational levels when they enroll in the curriculum.
- To what extent will students' parents and peers support their enrollment in thematic studies? This information has implications for student enrollment support from others and assists in determining whether students will actually enroll.

The Workplace

Information gathered from businesses and industries can also be a valuable contributor to curriculum decisions. However, designing the thematic curriculum differs markedly from curricula focusing on preparing students for specific jobs and occupations. Rather than just basing content specifically on detailed job task information gathered from workers employed in

specific jobs, a broad theme serves as the content organizer. Information gathered from businesses and industries located in the area served by the school or school district assists in defining this organizer. Once obtained, information can be used to aid in (1) deciding what the theme will be (e.g., manufacturing, marketing, travel and tourism, the built environment), (2) determining aspects of the theme that will serve as the curriculum organizer, and (3) identifying potential ways businesses and industries can contribute to creating the curriculum and providing support. It should be noted that selection of a content organizer need not be based on what is occurring or exists in the local area. For example, even though the nearest airport may be over 50 miles from a high school, the school faculty might decide to implement a curriculum focusing on the aviation and aerospace field since this focus will be interesting and challenging to students. Faculty at another high school may decide to focus their curriculum on the aviation and aerospace field because airports and aviation- and aerospace-related industries and businesses are close by and offer a number of employment opportunities. Questions asked of businesses and industries that can assist in making curriculum decisions are included in Figure 6-2.

Figure 6-2 Curriculum-Related Questions To Ask Businesses and Industries

- To what extent do different workplaces focus their efforts on common themes? For example, it may be useful to know if a number of the businesses and industries focus directly and extensively on manufacturing, health care, or some other broad theme area.
- What potential exists for businesses and industries to become partners and/or assist in other ways with implementing and otherwise contributing to the thematic curriculum? This might include providing students with workplace job shadowing and internship opportunities and assisting in creating and maintaining the curriculum (e.g., providing teachers with opportunities to intern in the workplace, serving on curriculum advisory committees, and offering to serve as guest speakers in the school).
- What potential exists for the curriculum to be of value to businesses and industries? Collaboration is a two-way street. The curriculum must be seen as contributing in meaningful ways to business and industry as well as educational needs. It is thus important to clearly document how the curriculum will benefit businesses and industries.

Figure 6-3. Curriculum-Related Questions To Ask Community Representatives

- To what extent may community agencies and providers be linked to a common theme or themes (e.g., public administration, protective services)?
- What opportunities exist for the community or a subset of the community to become a partner in providing the curriculum? Although often ignored as a potential resource, the community services and agencies can make excellent partners.
- What contributions can the curriculum make to the community? Again, it is important to document ways the thematic curriculum can contribute to the community.

The Community

Details about the community can, likewise, provide valuable information for curriculum decisions. By extending external scanning to the community, information may be gathered about how community activities, including those of public service providers (e.g., local government, chambers of commerce, health service agencies) can contribute to the thematic curriculum. The types of community-related questions asked, which are similar to those asked of businesses and industries, may be found in Figure 6-3.

Obtaining School, Workplace, and Community Information

Useful information may be gathered in several ways. The most widely used approaches are face-to-face interviews, telephone interviews, and surveys. Procedures for conducting interviews and surveys are available from a number of sources (e.g., Finch & Crunkilton, 1993; Frey, 1983; Spradley, 1979). It may also be useful to examine community records and information bases. For example, telephone directories can reveal how many and what types of employers are involved in some way with the transportation field (e.g., automotive sales and service, railway operations, aviation, moving companies). Curriculum advisory committees can also provide meaningful information. If an advisory committee is established early in the curriculum development process, committee members who represent that theme can assist by identifying useful information sources available in the area.

Regarding specifics to be asked about the school, the workplace, and community, questions listed in this section can assist in gathering basic information for curriculum content decisions. Questions related to a specific theme and to a certain locality may be added as necessary so more detailed local information is gathered.

Identifying and Selecting Content

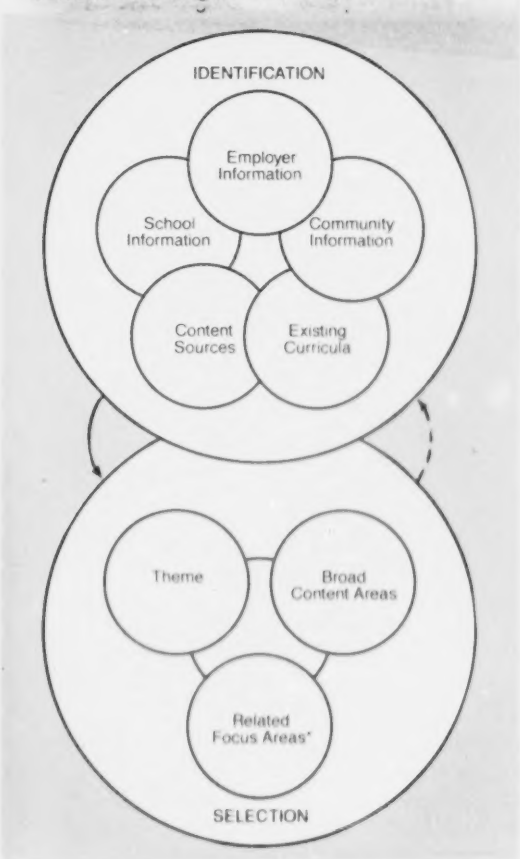
Identifying and selecting thematic curriculum content is a key component of the development process. Unlike curricula for many content areas that have been developed and refined over the years and are readily available for review, examples of thematic curricula can be very difficult to locate. Additionally, since the thematic curriculum is sometimes tailored to a specific locality or region, there may be little opportunity to take an existing curriculum from one school and implement it in another school without first making major changes.

Content Identification

In Figure 6-4, an overview of the content identification and selection process is provided. *School, employer, and community information* is fundamental to the process since it provides both a context and a starting point for content decisions. It is especially important to gather information about standards that can affect what is taught, how it is taught, and the extent to which student learning should occur in the school. These standards may be schoolwide, school districtwide, or take the form of state learning expectations for students. For example, statewide student learning standards such as "use technologies as extensions of the mind" and "write and speak with power, economy, and elegance" (Eggebrecht et al., 1996) could be important determiners of what content will ultimately be included in the curriculum. Other standards such as those that must be met in order to be certified as an emergency medical technician or to receive a private pilot's license may affect the content provided in a thematic curriculum with a health and human services or an aviation and aerospace technology emphasis. Other *content sources* should not be overlooked. Examples of broad industries and fields and related information can provide meaningful input for content selection. Included in Appendices A, B, and C are several examples of industries and fields; content organized around broad themes; and career clusters, pathways, and majors. These examples can be used to stimulate discussion and make decisions about what should be included in the thematic curricula. The *Dictionary of Occupational Titles* (U.S. Department of Labor, 1991) is another excellent information source since it presents information about a wide range of occupational areas and clusters (see Appendix A).

Many *existing curricula* such as those in marketing, agriculture, technology, and business education are broadly and comprehensively organized and may thus be potentially useful information sources. It is important to note that the thematic curriculum does not have to be created from scratch. As with most curriculum work, ideas can be drawn from a variety of sources and shaped to fit the local situation.

Figure 6-4. Theme Content Identification and Selection: Building from an All Aspects Base



*Functions, issues, concerns, and technological knowledge and skills

Content Selection

Also included in Figure 6-4 are core elements of the thematic curriculum: a theme (e.g., industry, field), broadly defined content areas, and related focus areas. As noted earlier, the *theme* serves as curriculum content organizer. It should be broad enough to encompass a predominant area. And how large should a theme be? Perhaps the best way to describe its size is to consider what schools have done. In some high schools, thematic curricula organized as career majors and academies may take up most of students' school time for three or four school years. However, other high schools involve students less than two or three periods each school day for two or three school years. Others may be organized into six or eight different but complementary themes (clusters, majors, or pathways), with each student being a member of one theme "team." Many high schools also coordinate and monitor students' paid or unpaid summer internships in business and industry. In effect, a theme is not "English" or "drafting"; it is something much more encompassing such as "International Baccalaureate," "business and marketing," or "manufacturing." When the theme is being selected, several questions may assist in providing direction. Does the potential theme . . .

- closely align with the needs of students who will be enrolled?
- build on employers' areas of strength and the ways they can contribute to curriculum success?
- link closely with and build upon community resources?

Examples of various themes and content (Appendices A and B) and their applications in selected high schools (Appendix C) are useful starting points for content decisionmaking. When these examples are combined with current school, employer, and community information and ideas drawn from other content sources, the result should be selection of a tentative theme.

Next, *broad content areas* are determined. To accomplish this, potential content is reviewed in relation to the selected theme. For example, if engineering and technology is the tentative theme of choice, information gathered about students, employers, and the community focusing on engineering and technology should be examined. Available engineering- and technology-related curricula and content sources may also be studied (Appendices B and C). A few questions related to tentative content areas follow:

- Do the broad content areas define the theme in comprehensive terms?
- Does school, employer, and community information reveal any additional content that might be included?

Finally, consider *related focus areas*. For example, in manufacturing, these might encompass the fiscal, economic, marketing, distribution, and management areas. Examples of theme-wide functions, issues, concerns, and technological knowledge and skills are included in Appendix D. As with the broad content areas, it must be decided which related focus areas exemplify and truly define the broad theme. Questions related to focus area content include the following:

- Which focus areas actually exist within the theme and assist in defining the theme more comprehensively?
- To what extent might employers and the community be able to assist with school- and work-based learning in related focus areas?
- To what degree can the focus areas be readily incorporated into the curriculum?

Team Building

The content selection process must include times when all those who will be involved in teaching the content have opportunities to voice their feelings and concerns. Teachers directly involved in core theme instruction are logically members of the curriculum team and should be able to offer

suggestions throughout the content identification and selection process. However, others who teach core-related subjects and/or coordinate students' work-based learning experiences should also be involved. These persons are in excellent positions to offer suggestions from their personal vantage points. They can also provide insights that may not have been otherwise considered. A useful way of bringing these educators together and getting their collective input is by using what Drake (1993) describes as the *transdisciplinary/real-world approach*. In this approach, which builds on strengths of the thematic approach, "Interconnections . . . are so vast they seem limitless: the theme, strategies, and skills seem to merge when the theme is set in its real-life context. Disciplines are transcended, but imbedded naturally within the connections if one cares to look" (p. 40). Drake goes on to say that the approach emphasizes relevance and meaning via a life-centered approach where "knowledge is explored as it is embedded in a real-life or cultural context" (p. 41). A *transdisciplinary web* has been devised by Drake to help educators shift their focus from disciplines to core learnings that are essential life skills for the productive future citizen. The transdisciplinary approach and web enable educators to move beyond specific disciplines, contexts, and situations. When Drake used a transdisciplinary web with curriculum writing teams, she found most participants discovered that knowledge is interconnected and value-laden. Thus, brainstorming that begins with a real-world focus (e.g., an industry or field) may lead to the identification of both broad content areas and related focus areas that include many functions, issues, concerns, and technological knowledge and skills. The transformational web example in Figure 6-5 uses Healthcare as a focal point. Building from Healthcare as an organizer, and using information gathered from the school, the workplace, and the community, as well as other content sources, a team can brainstorm, discuss, and then detail the broad content areas that should be embraced by this organizer. Concurrently, the team can consider what aspects of Healthcare impact at local, state, national, and international levels. Next, related focus areas can be identified that link with both the theme and the broad content areas. The result is a thematic curriculum that has been organized based on a wide variety of information.

Selecting Existing Curricula: A Special Case

During the content identification process, thematic curricula may be identified that have already been organized and packaged and may even be ready to implement. In fact, several organizations have prepared curricula that appear to have a strong theme focus. Potentially, these curricula can shorten the decision process described earlier by allowing the curriculum to be implemented much more quickly.

Even though several excellent curricula have been produced, a few cautionary notes are in order. First, ease of curriculum implementation

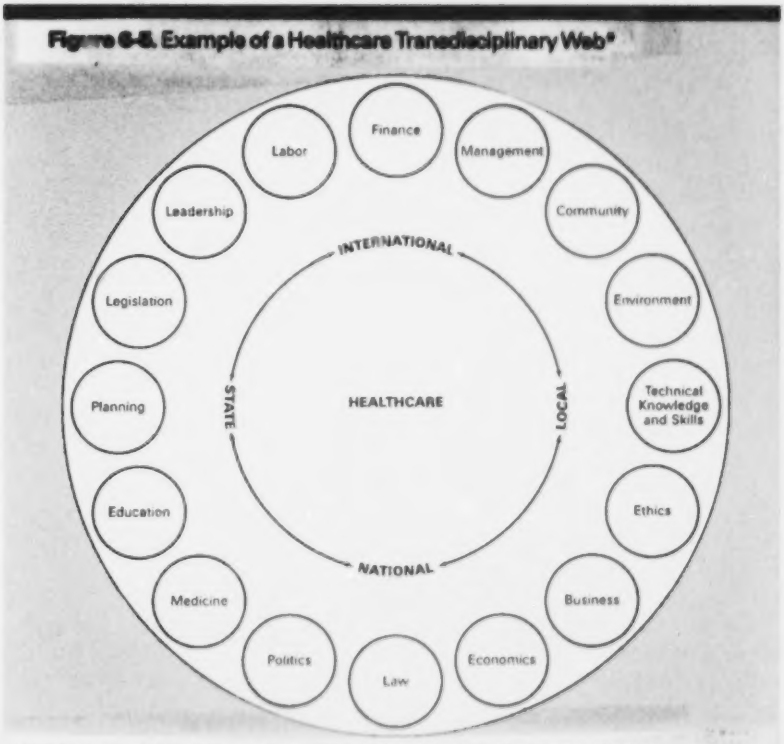


Figure 6-5. Example of a Healthcare Transdisciplinary Web*

***This example builds on the web concept devised by Drake (1993).**

should not be confused with quality and focus. A quality thematic curriculum must be in harmony with the school, its teachers, and its students as well as employers and the community. It would be most unfortunate to implement a curriculum and discover later that it was a poor choice. Second, the selection of an "off-the-shelf" curriculum may create ownership problems. As Harvey (1990) indicates, "the best predictor of ownership is participation" (p. 35). Teachers who are provided with opportunities to create curricula may feel they are curriculum owners rather than merely renters. Since pride in ownership can generate teacher satisfaction and motivation to improve the curriculum, it is very important to actively involve teachers in the curriculum selection process. And finally, it is important for teachers to have some negotiation power in terms of what is taught. If existing curricula include learning standards that do not make provision for teacher negotiation, teachers may believe the curriculum had been dumped on them by an outsider and never accept it as being usable and credible.

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Organizing and Integrating Content

Most traditionally developed courses, programs, and curricula use textbooks as starting points for organizing and sequencing content. However, since reliance on a specific textbook tends to isolate what is taught and how it is taught, creating a thematic curriculum needs to occur in more comprehensive ways. Organizing and integrating content provides both teachers and their students with a broad framework for instruction and learning. Some teachers view this framework as a way to help structure content; whereas, others see it as a way to destructure content. Regardless of personal views, organized and integrated content should provide students with opportunities to learn about a broad theme in meaningful and effective ways. Information about linking curriculum with instruction is presented in Section 7. However, this does not mean content organization and integration should exclude consideration for student learning. As the development progresses, thought must be given to ways that students' learning needs can be met.

Organizing Content

Armstrong (1989, pp. 78-80) presents four of the more popular approaches to curriculum content organization. Each of the four is important to consider when determining how content may be organized:

1. the thematic approach
2. the chronological approach
3. the part-to-whole approach
4. the whole-to-part approach

Each of these approaches can make contributions to the organization process.

The *thematic approach* has already been described in some detail. However, another example of its application is in order. Consider a theme called the built environment. Examples of broad content areas for this theme might be architecture, urban planning, environmental design, construction, engineering, and public services. Related focus area examples might include community issues, environmental issues, architectural issues, finance, health, and safety, as well as technological knowledge and skills related to the built environment.

The *chronological approach* is of greatest value when content is sequenced according to a calendar. This approach is most frequently used when historical subject matter is being organized. Its value may be seen when the historical aspects of a theme are taught. For example, in a thematic curriculum focusing on hospitality, tourism, and recreation, it might be

meaningful to organize content on the rise of labor unions in a chronological order that is based on historical events.

Part-to-whole and *whole-to-part* approaches depend on how the content is to be utilized. Thus, content for a thematic curriculum focusing on communication might be organized so broad aspects of the communication field such as its contributions to quality of life, economic development, and so forth are taught first; followed by individual contributions to the communication process such as television, radio, the World Wide Web, and graphic communication. An aviation careers curriculum might begin with parts: airport operations, aircraft safety, flight regulations, and other basic technological components of the field; and merge these parts and others together many months later into the student's first solo flight and, ultimately, award of a private pilot's license.

These four approaches to content organization are useful tools for any curriculum development effort. However, the chronological, part-to-whole, and whole-to-part approaches are of value when organizing content subsets within the thematic curriculum. Thus, for example, the chronological approach might be most appropriate for organizing history content subsets of the thematic curriculum (e.g., historical aspects of an industry or field).

Integrating Content

Content integration flows logically from curriculum organization. As noted in Section 4, curriculum integration is one of several innovative organizational options that are available to educators. But why is integration so important to consider at this point in the curriculum development process? In an article describing lessons learned from a half-decade of work in activist school reform, Nathan (1996) presents seven ways that educational change may be made more successful. Among the lessons, Nathan notes that "making schoolwork 'real' is central to engaging many students" (p. 43). In effect, linking schoolwork with the real world in creative ways can help students who have been turned off education to get turned on again. Drake (1993) offers several other benefits of integrating the curriculum: "Integration, by reducing duplication of both skills and content, begins to allow us to teach more. It also gives us a new perspective on what constitutes basic skills" (p. 2). She goes on to say that (1) integration links subjects in ways that mirror the real world and (2) teaching in integrated ways aligns with learning research that supports learning through connection-making. Logically, a thematic curriculum can offer teachers a number of opportunities to provide integrated instruction to their students. So if a thematic curriculum is configured in ways that connect "basic" and "real world" content, it is more likely that teachers will accept the thematic content and teach it in integrated ways.

Fortunately, thematic content can be organized in an integrated fashion. Since a theme can include content drawn from numerous areas and these

Figure 6-6. A Travel and Tourism Integration Planning Matrix*

	Teaching Area				
	Science	Mathematics	English	Social Studies	Marketing
Function**					
Business	1***	3	3	3	3
Economics	1	2	1	3	3
Finance	1	3	1	1	3
Planning	2	3	2	2	3
Law	2	2	3	3	2
Ethics	3	3	3	3	3
Knowledge	3	3	3	3	3
Skills	3	3	3	3	3
Other					

* This matrix presents several examples of functions and teaching areas and the extent to which they may be linked for integrated instruction.

** Functions, issues, concerns, and technological knowledge and skills

*** Teachers' ratings: 1 = little or no integration link, 2 = moderate integration link, 3 = strong integration link

areas may be organized so subject-based is linked with the real world, there is greater potential for integrating the thematic curriculum.

Integration linkages may be identified using an *integration planning matrix*. The matrix typically includes traditional teaching areas on one axis and theme-wide functions, concerns, issues, and technological knowledge and skills on the other. Included as Figure 6-6 is an integration planning matrix for a travel and tourism theme. Teachers who represent both the theme and the various teaching areas begin the planning process by brainstorming to determine how teaching areas link travel and tourism with the more detailed functions, concerns, issues, and technological knowledge and skills that have already been identified by using the transdisciplinary web (Figure 6-5). The process places emphasis on building a base from a broad theme such as an industry or field rather than using a traditional teaching area or areas as a base. Realistically, as teachers decide what to include in this thematic base, they must also focus on the standards they feel should be set for their students. Depending on what standards have already been established (e.g., state-level standards of quality have already been determined for students), teachers may choose to include discussion of these established standards while they are deciding how

teaching areas and theme details align. Alternatively, they may wait until after the matrix discussion is complete to discuss where standards fit in. This alternative has the advantage of enabling teachers to think through how both the teaching areas and the theme content can be organized, combined, and integrated in meaningful ways to meet specific standards. However, regardless of the processes used to ensure that curriculum content is relevant, consideration must be given to the ways that content aligns with standards students should need. Presented in Figure 6-6 is a teacher group's view of the degree to which teaching area content aligns with the Travel and Tourism field. The result of teachers' deliberations serves as a framework for teacher collaboration across teaching areas. Ultimately, this result can enable students to become more actively engaged in their learning (Seely, 1995).

Updating Content: A Continuing Process

Identifying and organizing content cannot be a one time activity. Just as the school, the workplace, and the community evolve, thematic curriculum content should evolve in response to these changes. Referring again to Figure 6-4, the dashed line from content selection to content identification reflects content's cyclical nature. Just as content identification flows into the content selection process, the content that has been selected should be examined periodically to be sure it is based on current school, employer, and community information. Depending on which has the greatest appeal, content may be examined on a regularly scheduled basis (e.g., twice a year, each year, every other year) or continuously. In effect, thematic curriculum content is only as good as its content and organizational base. Obsolete curriculum content is of little value; but when organized properly, cutting-edge content can benefit students by exposing them to the latest information about and experiences related to a broad theme.

Summary

Given the variety of content options that are available, dealing with thematic curriculum content can be a difficult and time consuming process. However, the rewards appear to be worth the extra effort. Documenting needs and opportunities; examining information about the school, the workplace, and the community; and identifying, selecting, organizing, and integrating content are all important parts of the process. Deriving curriculum content without giving consideration to these areas can result in key content being overlooked. This can, in turn, result in a curriculum that does little to help students learn about a broad theme in ways that transcend disciplines.

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SECTION 7

Linking Curriculum with Instruction

Introduction

Even the best curriculum is doomed to failure if it is not properly linked with instruction. On the other hand, instruction that draws from and builds upon a meaningful curriculum base has the potential to greatly improve the teaching/learning process. As with other curricula, the thematic curriculum is only useful to the extent that it contributes to quality instruction. Instruction grounded in a broad theme has the potential to assist students in seeing the relevance of learning by connecting it with real-world situations and expectations. Engaging students in authentic, real-world experiences that relate to themes can help motivate them to become involved in additional learning and acquire knowledge and skills that transfer to other situations and settings.

In this section, some of the more popular teaching/learning strategies used to enhance the value of thematic curricula are presented. Many of these strategies are well known, whereas, others may be relatively unknown. The strategies have been organized into three areas: (1) school-based teaching/learning strategies, (2) work-based teaching/learning strategies, and (3) strategies connecting the school and workplace. Clearly, these three areas have a great deal in common and tend to overlap each other. It may, thus, be noted that teaching does not begin and end in school settings. Contemporary teaching, and therefore learning, begins in a school classroom or laboratory, a workplace, or somewhere in between; and ultimately can end up somewhere else.

School-Based Teaching/Learning Strategies

School-based teaching/learning strategies organized around broad themes offer numerous opportunities for teachers and students to work together in the classroom and laboratory. Contextual, interactive instruction that is integrated across subjects aligns well with the thematic curriculum. By using interactive and interdisciplinary approaches, teaching can engage students in activities that include a broad range of functions, issues, concerns, and technological knowledge and skills. The learning environment can foster connections between knowing and doing and active participation and application of knowledge, skills, and values in real-world problem-solving settings. First, a description is given of several integrated

teaching models that are compatible with thematic curricula. Then, examples of school-based teaching strategies are described to include interactive teaching, small group activities, cooperative group projects, case studies, and simulations.

Integrated Teaching Models

In integrated teaching/learning settings, group interactions become central to the process. If organized in the proper fashion, using a broad theme as a starting point for integrated instruction can ultimately provide students with opportunities to accomplish group tasks and projects related to that theme (e.g., industry or field). The social context associated with integrated teaching can provide students with a greater appreciation for others and develop abilities needed to learn complex concepts such as solutions to theme-based problems.

Building on discussions of integration presented in Sections 4 and 6, it may be most meaningful to consider ways instruction based on a broad curriculum theme may be organized. Fortunately, several models that schools are using to successfully integrate instruction have been identified. As noted in Figure 7-1, the more commonly encountered models focus on relationships within, between, and across teacher and student groups (Fogarty, 1991; Grubb, Davis, Lum, Plihal, & Morgaine, 1991).

At one end of the integration continuum is a traditional school model where courses are organized around separate subject areas. In this setting, an individual teacher works with students in a classroom or laboratory setting focusing on teaching the course subject matter. At the other end of the integration continuum, an entire school is organized around broad themes (e.g., clusters, majors). In this setting, teachers from different subject areas work as teams to teach students through multidisciplinary experiences that cut across subject matter lines. Students learn individually and in small

Figure 7-1. More Commonly Used Integration Teaching Models

Relationships	Within	Between	Across
Teacher Relationships	Individual Teachers	Two or three teachers	Teams of teachers
Subject Relationships	Within a single subject in a school	Between several subjects within a school	Across all subjects throughout the school
Relationships to Learners	Engaged in separate courses	Connected across courses and around related themes and topics	Organized in multiple groups, networked across subjects

groups, interacting with teachers who provide them with the instruction needed to attain instructional objectives. At the middle of the continuum is an integration process where small groups of teachers from different subject areas within the school collaborate with each other for varying time periods. The students are enrolled in separate courses but are taught to apply knowledge and skills that cut across traditional subject matter lines.

Integrating the Curriculum at a Secondary Technical Center

School-Based Strategies

When implementing thematic curricula, specific classroom and laboratory teaching/learning strategies need to be identified and used. Traditional classrooms have typically relied on the lecture-demonstration approach to teaching. However, changes in student composition and new knowledge about how people learn have created a need for teachers to move beyond their roles as transmitters of knowledge and become facilitators of learning. Student diversity calls on teachers to create more active and collaborative teaching and learning modes. Teachers are encouraged to view the learning process as an effort to construct new knowledge through active cognitive involvement. This process requires a collaborative, interactive teaching environment using a variety of visual, auditory, and tactile instructional materials (Stover, Neubert, & Lawlor, 1993).

Interactive teaching/learning is composed of three essential components: (1) elements, (2) teaching strategies, and (3) instructional resources (Meyers & Jones, 1993). Teachers can combine these components in creative ways and design active learning environments that focus on broad themes. Figure 7-2 provides examples of elements, strategies, and resources commonly used in an interactive teaching environment. And how are these components used? *Elements* are active learning verbs that are applied to both general

Figure 7-2. Components of Interactive Teaching Strategies

Elements

- reading
- writing
- questioning
- talking
- listening
- other
- conceptualizing
- applying ideas
- summarizing/ scanning
- interacting (collaborating)
- solving problems (analyzing)
- testing theories
- adapting
- questioning
- demonstrating
- visualizing
- exploring
- self-evaluating
- reflecting
- illustrating
- concluding

Teaching Strategies

- small group activities
- cooperative group projects
- case studies
- simulations
- lectures
- class discussions
- demonstrations
- teamwork
- mental calculations
- movement
- review
- guided practice
- media integration
- technical applications
- mentoring
- role playing
- cooperative learning
- individualization
- mastery learning (self-paced)
- independent work
- drawings
- music
- facilitation
- projects/products
- goal setting
- modifying/ accommodating
- questioning
- peer and cross-age tutoring
- job coaching
- student/teacher contract
- journal writing
- experiments
- metaphors/analogies
- collaborative teaching
- curriculum integration

Instructional Resources

- textbooks
- videotapes
- audiotapes
- library services
- field trips
- tools
- manipulatives
- directories
- worksite visits
- equipment
- computers
- other
- materials
- guest speakers
- supplemental materials

content and the mastery of that content. For example, reading might be applied to technical manuals, thus producing "reading technical manuals." In order for this element to be assessed, it is important to know such things as how well the manuals should be read, what should be remembered, and whether information read in the manuals is to be applied in some way. *Teaching strategies* point to ways that elements may be taught in interactive ways; thus, teaching students how to test theories might require the use of strategies that are quite different from those used to teach students some aspect of writing. *Instructional resources* can also contribute to interactive teaching and learning. The selection of resources varies as a function of the elements to be focused on and the teaching strategies selected to be used. In order to illustrate how teaching strategies may be used to teach in interactive ways, four of these strategies are described in some detail. The strategies described include small group activities, cooperative group

projects, case studies, and simulations. Additional examples of strategies are presented later in the section.

Small Group Activities

Small group activities engage students in short-term activities focusing on specific assignments or objectives. These activities are useful in assessing students' prior knowledge or skill levels, preparing for guest speakers and field trips, developing clarification questions that focus on specific assignments, summarizing discussions and concepts covered in classroom instruction, and watching video presentations. Small groups may vary in size from two to six students. Groups of two or three students are most beneficial for generating ideas or summarizing main points while groups of four to six work best for problem-solving or brainstorming tasks. It is important to prepare specific guidelines for small group activities. Before initiating small group work, the following questions should be considered:

- What objective or purpose is there for using groups?
- How will learning be assessed?
- What role will the teacher play?
- How large will each group be?
- How will students be assigned to the groups?
- What guidelines will be given to each of the groups?
- How much time will be allotted to group work?
- What will be done to synthesize or summarize the outcome of the group activity?
- How is the process/outcome applicable to "real-life" situations?

Addressing these questions can contribute to positive small group process outcomes (Meyers & Jones, 1993). Small group activities encourage students to assume responsibilities for active learning. Students engaged in small group activities are better able to learn to listen, reflect, clarify their thoughts, and appreciate others' viewpoints.

Cooperative Group Projects

In comparison to small group activities, the cooperative group project engages a larger group of students for a longer period of time (several days to several weeks). Members of the group collaborate to organize, plan, and conduct a specific project with individual student efforts contributing to total group accomplishment. Cooperative group projects allow students to integrate and apply skills and knowledge from various subjects. Students utilize constructive criticism, accept and challenge others' viewpoints, and participate in group consensus decisionmaking.

Six steps should be considered when organizing a cooperative group project (Sharon, 1994):

1. Determine the project.
2. Plan and organize the steps or tasks needed to complete the project.
3. Conduct the project.
4. Plan the presentation of the project to others.
5. Make the presentation.
6. Evaluate the project outcomes.

Cooperative group project success depends on the interaction among student members, and interaction between students and teachers. The teacher helps students to apply their skills and knowledge to produce a product or solve a problem, motivates students to make a personal connection with the proposed project, guides students to sources of information related to particular topics, and assesses students' abilities to plan and work together. Students reflect on the personal significance of the experience and demonstrate integrated and applied learning skills.

The cooperative group project stresses team member interdependence in finding solutions to problems. Projects also provide opportunities for students to integrate skills and knowledge around realistic projects that can include exposure to a wide range of functions, issues, concerns, and technological skills. Students may thus make better connections with real-world situations, build closer partnerships with peers and teachers, and further stimulate their own learning.

Case Studies

Case studies offer excellent opportunities to create active teaching situations. A case study is a narrative description of a realistic event that requires a solution to a problem or answers to questions. They are commonly used to provide practical illustrations of material discussed in lectures, to study particular incidents, and to illustrate "best practices." Case study activities require students to be actively involved in reading, discussing, listening, analyzing, interacting with each other, evaluating solutions, consensus building, and making decisions or recommendations. Since many case studies are based on real-life problems and open-ended with more than one possible solution, developing a logical rationale for decisions and gaining experience at making informed decisions are important outcomes. The case study approach allows students to explore the multidimensional nature of complex issues in a comprehensive manner.

A clearly defined process for working with case studies is followed. Students receive case information in a written document, audiovisual tape, or interactive computer program. They discuss and analyze the situation and work on possible solutions in small groups. Each group proposes a set of recommendations to solve the dilemma or problem. The teacher observes and facilitates group discussion as needed, interprets or clarifies points that are not well-understood, and helps students make important connections about the case under study.

While case studies provide a versatile teaching medium, teachers must be well-prepared and organized to use them as a teaching strategy. There are several important factors to consider when case studies are used with students (Mostert & Sudzina, 1996). Teachers must

- have a thorough understanding of the case study content.
- select a case study that is relevant to the subject(s) being studied and that will capitalize on student interests and current knowledge.
- structure the classroom environment for multiple small group discussions that provide opportunities for active participation in case discussion.
- review the questions to be discussed and the decisions or outcomes each group is expected to share with other groups.
- develop guiding questions to review and summarize the main concepts to be learned as a result of the case study activity.
- model case discussion and interpersonal communication skills.
- direct students to respond in their analysis to five areas of inquiry: (1) issues, (2) perspectives, (3) actions, (4) consequences, and (5) knowledge needed.
- assist students in articulating (verbally and in written form) their group and individual responses to the dilemmas posed in the case.
- relate the outcomes of the case analysis and discussion to the course content.

Thus, case studies offer learning opportunities based on realistic situations or problems. For example, students are offered the chance to vicariously learn about complex, problematic workplace situations within the safety of the classroom. Effective use of case studies enables students to

develop decisionmaking and problem-solving skills that can be transferred to and used in real-life situations.

Simulations

Simulations are designed to capture realistic aspects of real-life situations. A simulation places students in an artificially constructed, yet realistic, context where they can practice and apply their skills and knowledge and receive frank feedback. "Simulations are not just concerned with imitating the known. They are capable of placing students in novel circumstances and stretching their experiences and capabilities in new and unexpected ways" (Fripp, 1993, p. xii). Simulations can include role playing, exercises and games, or computer-based models. Role playing involves a small number of students who act out various character roles in a prescribed scenario. For example, in a law enforcement class, students can learn the proper technique for making an arrest of an unruly individual. The simulated exercise or game allows students to apply acquired knowledge and skills. For example, students might hold a mock stockholders' meeting and debate issues such as a leveraged buyout or compensation package for the chief corporate officer.

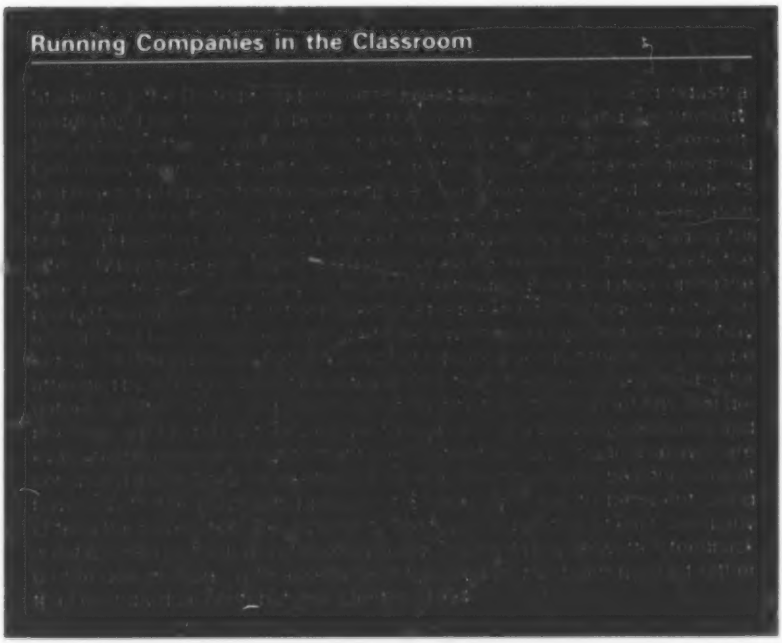
Computer-based models use computer software to deliver and manage the simulated situation. Quite often, computer-based simulations provide experiences that may be too costly or dangerous to provide in a real-life situation. In recent years, many computer-based simulations have been developed for instructional purposes. One example is a simulation which presents a manufacturing business organized as a corporation. Students engaged in the simulation are faced with many of the problems and decisions that are faced by those who operate large businesses.

When simulations are used for learning activities it is important for the teacher to

- select a simulation that helps students apply, practice, and synthesize previously learned concepts and skills.

- outline the simulation roles and responsibilities clearly to students.
- select students carefully for roles appropriate to their personalities and ability levels.
- supervise the simulation according to the roles or guidelines.
- conduct a debriefing at the conclusion of the simulation that emphasizes what went on during the simulation and how it relates to previously learned material.
- conduct a student assessment to measure the learning that occurred during the activity.

Simulations provide dynamic, realistic situations that motivate students to engage in active learning. They allow students to demonstrate their capabilities in relatively "safe" simulated environments without the danger of harming themselves or others. They allow teachers and students to apply and practice generalizable, as well as specific, skills. Within a collaborative team effort, students synthesize and solve problems and build understanding and empathy for other viewpoints and positions. A series of constraints are presented at critical decisionmaking intervals. The students are able to relate the good, bad, anticipated, and unanticipated results to their own actions. Simulations should be used sparingly due to their complexity and the large amounts of time they can consume.



Work-Based Teaching/Learning Strategies

Work-based teaching/learning strategies assist students in getting firsthand exposure to the workplace. These strategies can be very beneficial to students; however, they require employers to provide quality learning experiences that give students a broad view of the workplace. The scope of work-based teaching/learning is first presented, followed by descriptions of several of the more common teaching/learning strategies that are used in the workplace.

The Scope of Work-Based Teaching/Learning

Teaching and learning in the workplace occurs on a continuum integrating three learning contexts: (1) formal, (2) informal, and (3) nonformal. Characteristics and examples of these teaching/learning contexts are shown in Figure 7-3 (Tamir, 1990-1991, p. 35).

Formal learning involves widespread, traditional in-school and in-class activities and experiences. Formal experiences are, for the most part, definable, predictable, and controllable. Formal learning that precedes nonformal experiences can facilitate student learning. For example, students enrolled in a horticulture class may study the durability of outdoor plants in certain weather conditions. As a follow-up activity, the students may visit a local landscape design operation to discuss plant selection practices and principles with the workers or manager. In this example, the formal in-class learning better equips students to ask pertinent and knowledgeable questions and assimilate the new information into existing knowledge. Formal learning and teaching can also occur in workplace settings. One example would be a department store manager providing all employees with a presentation and discussion focusing on shoplifting. Another example is an automotive dealership service manager who sends service advisors to a three-day workshop dealing with advanced service sales techniques. While formal learning at school and at the worksite is advantageous, educators and workplace representatives must seek to develop strategies and methods for improving workplace learning outside of the formal setting.

Informal learning, sometimes referred to as incidental learning, applies to situations where learning is unintentional or spontaneous and usually a byproduct of accomplishing a specific task or job. Informal learning is reflected in what students read, listen to, and view in their "non-school" or social life. *Nonformal learning* occurs in planned but flexible ways in institutions, organizations, and situations outside the sphere of formal "schooling" (Tamir, 1990-1991). Nonformal learning can be intentional, planned, and have specific outcomes. Informal and nonformal teaching and learning takes place at the worksite through direct and indirect interaction with equipment, materials, information, and people. In fact, in

Figure 7-3. Characteristics and Examples of Formal, Informal, and Nonformal Learning Contexts

Characteristics*	Formal Learning	Informal Learning	Nonformal Learning
Place	Classroom, school, workplace	No special institution home/ neighborhood	Nonschool institution
Learning Environment	Pre-arranged	Not arranged	Pre-arranged
Subject Matter	Structured	Not structured	Structured
Management of Learning	Teacher/ supervisor/ students	Students	Teacher/ supervisor/ students
Motivation	More extrinsic than intrinsic	Intrinsic	More extrinsic than intrinsic
Assessment	Included/ expected	None	Not expected
Examples of Activities	• Lecture presentations • Questioning (written and oral) • Reading instructional materials • Written and oral presentation of ideas • Debates • Research • Discussion • Reflection	• Observation • Trial and error • Actions on the job • Interpersonal relationship development • Conversations • Hobbies • Watching TV and/or listening to the radio • Reflection	• Self-directed learning • Coaching • Networking • Field trips • Educational television and radio programs • Open-ended field experiments • Independent experiences • Reflection

*Included in the above figure are some characteristics extracted from Tamir, 1990-1991

a work-based environment, much of what a student learns will be informal or nonformal. For example, students at a worksite can develop appropriate working relationships with their coworkers and supervisors. They can also

learn to closely observe their coworkers performing specific tasks and strive to imitate these performances independently. Involvement in informal and nonformal learning activities in the workplace has been found to be strongly associated with intentions for further study or career aspirations in related areas (Tamir, 1990-1991).

Both informal and nonformal learning offer an alternative to formal learning that may encourage educators and workplace personnel to rethink previously held notions of workplace learning. Educators must reflect on their past traditional roles and challenge themselves to seek alternative methods and contexts to promote workplace learning and enhance the linkages between formal, informal, and nonformal teaching and learning.

Work-Based Strategies

Several work-based teaching/learning strategies have already been discussed in Section 5. These include job shadowing, job mentoring, and youth apprentice programs. *Job shadowing* is perhaps the most readily available and commonly used strategy. With job shadowing, students spend a short time, usually measured in hours, following assigned workers around as they perform their job and observing what they do. Another strategy, *job mentoring* enables students to spend a greater amount of time in the workplace, working under the mentorship of one or more employees. Mentoring is often provided to students who are taking internships in the workplace. *Youth apprenticeship* programs typically engage high school students in apprentice-like experiences. These programs emphasize formally structured learning experiences on-the-job that closely correlate with students' school studies.

Regardless of the work-based teaching learning/strategy, work experience must be carefully coordinated among the employer, the student, and the teacher. This coordination is usually documented in a written agreement. The agreement typically addresses occupational and academic studies competencies the student is expected to learn and ways that students' learning experiences will include broad rather than narrow exposure to the workplace. These strategies can provide students with first-hand exposure to and learning in actual workplace settings.

Learning Process Strategies

It is important for students to develop learning process strategies that can be applied when they are working and learning on the job. Students need to be taught strategies they can use when approaching tasks and situations that utilize several cognitive learning processes. These strategies have been recommended because of their value in enhancing informal and nonformal learning at the individual level (Marsick, 1987; Marsick & Watkins, 1990; Tamir, 1990-1991).

- Look at the broadest possible view of the situation and analyze it from as many dimensions and angles as possible. For example, understand how a business or industry is organized and managed in relation to the individual employee's assignment.
- Establish a hypothesis or conception of what will be experienced in the workplace that can be confirmed or modified through actual practice. For example, assist nursing students to develop attitudes and knowledge about patient care and liability before they have their first clinical experiences in hospitals. The knowledge and attitudes will be either confirmed, modified, or revised based on the incidental and informal experiences they have during their clinical practice.
- Seek advice and reactions from others to confirm or refute the application of the principles or concepts experienced in the workplace. For example, through classroom instruction a student learned about techniques that could be used to value the viewpoints of others. A few months after receiving the classroom instruction, the student took a summer internship where she worked with a committee to address a quality assurance problem. She remembered the techniques and sought to implement them during committee meetings. At various times, she solicited comments from other workers about how well she was interacting with committee members when viewing and valuing their opinions during committee discussions.

"Regardless of the work-based teaching learning/strategy, work experience must be carefully coordinated among the employer, the student, and the teacher."

- Engage in deliberate, reflective, transformative learning from critical incidents that occur when performing routine workplace activities. For example, an intern was given responsibility for entering data using a computer-based software program. After several hours, the intern completed the assignment and presented it to her supervisor. The supervisor was not pleased with the format of the final product. After receiving feedback from the supervisor, the intern went back to work and completed the work satisfactorily. At the end of the day, the intern reviewed the incident and developed a strategy for handling similar situations.

These strategies can be used by students while they work on routine tasks individually or as part of a group. The strategies assist students to learn and thus benefit from critical incidents that occur as part of everyday life in the workplace.

Coaches and / or mentors play a critical role in fostering student success in acquiring specific workplace values and skills. A mentor has personal experience in and knowledge about the workplace and can support, guide, and counsel a student in accomplishing tasks and interacting with others. The mentor can strengthen student skills and provide feedback through informal teaching and learning situations. Instruction may be designed to address a wide range of organizational concerns such as dress codes, job performance, team building, leadership, and communication (Lynch, 1993).

Students can profit from work-based experiences that capitalize on informal learning. When serving as an extension of the school, the workplace can provide opportunities for students to apply skills and knowledge and test values and principles in the real world. The workplace also serves as a vehicle for a safe and positive transition from school to work. Linking school-based learning with workplace learning experiences is critical to students' long-term success.

Strategies Connecting the School and Workplace

There are several teaching / learning strategies that can be used to connect the school and the workplace. These include the traditional cooperative education and related instructional classes that have been typically offered in high schools. More recent additions to the list of connecting strategies include clinical interviews, student logs and journals, project review panels, and small group seminars.

Clinical Interviews

The simplest strategy for connecting school and workplace is the clinical interview. The process begins with the school internship coordinator and the student intern meeting to discuss student achievement of a predetermined set of objectives or competencies. When determining student expectations, consideration should be given to the particular workplace where the student is employed, and the extent to which student experiences include broad exposure to the many aspects of the company. For example, one objective might be to describe the organization's mission statement and explain how this relates to the activities being performed by the student. A student may be expected to explain how the company responds to the needs and expectations of its customers. These aspects of the company can be learned formally or informally in the workplace. However, the clinical interview connects what the student has learned about the company in the school setting and what the student has learned about the company in the workplace setting.

Student Logs and Journals

Written logs or journals of student activities and thoughts constitute another active strategy for helping students to make meaningful connections between school and the workplace. The log or journal is a useful tool in helping students focus on their daily activities. Students are encouraged to record daily activities, tasks, observations, and reflections about their experiences and how these experiences relate to them and various aspects of their work. The log or journal is a useful tool in helping students focus on their daily experiences. The log or journal may also be used to identify workplace questions or issues that need to be answered or clarified. Reflection, a self-directed learning strategy, can help students to contemplate the day's events and attach personal meaning to what they are learning.

Logs and journals can be used to improve the academic quality of internships (Alm, 1996). The process of journal writing forces students to integrate new information with what is already known and allows teachers to assess how much learning has taken place in both the school and work settings. For example, students may be asked to write about how business principles and theories learned about in the classroom relate to actual workplace practices. Students may be asked to present detailed information during clinical interviews and prepare a final report on this experience for presentation to a review panel. Additionally, logs and journals may be used to highlight the relevance of experiences related to a broad theme (e.g., industry or field). After documenting experiences while serving as an intern, a student may use his or her journal to identify which entries are related to the broad industry or field he or she has been associated with as contrasted with those entries focusing on the company within which the student has been working.

"Students can profit from work-based experiences that capitalize on informal learning."

Procedures for teachers to follow when using the journal writing teaching/learning strategy are outlined by Alm (1996) below:

- State the instructions clearly. Students are to use journals to reflect on their work experiences and to express themselves freely about what they think or feel. They should not "write for the teacher." Reassure students that what they think and feel has validity.
- Provide students, initially, with open-ended questions for reflection (e.g. "Are there differences between what you observed in the field and what you learned in class?" and "What could account for these differences?").
- Design a journal format that is flexible and comfortable for students to facilitate the free flow of thought. Consider the students' writing styles and the teacher's convenience in collecting and reviewing the material.

- Encourage students to write regularly during their work experience. The entries should be timely but not so frequent as to become overwhelming.
- Devote sufficient time to reviewing and commenting on the journals throughout the student's work experience. Ask the students questions that help to integrate the work experience with previous classroom work. This helps the students remain focused, puts the work experiences in context, and provides encouragement.
- Grade the journals and give them sufficient weight. This will encourage students to devote adequate time and effort to journal writing. Grading criteria should relate to the purpose of the journal assignment. The level of completeness, originality, and effort by the students can also play a part in the final grade.
- Consider having the students share their journal observations and insights with others.
- Have work experience supervisors maintain their own journals of student's progress to be submitted periodically to the classroom teacher. Teachers can then use the supervisor's journal to monitor the student's development and identify situations that require intervention.

Project Review Panels

The project review panel brings representatives from the school, the workplace, and the community together in one location to examine student workplace experiences. Panel membership typically includes four or five adults such as work experience teacher/coordinators; building principals; academic and vocational teachers; mentors; job coaches; and others who may represent community groups, including the school board, Chamber of Commerce, and/or labor unions. Some of the panel members have also served as student advisors and mentors throughout the year.

The panel is charged with reviewing and assessing a student's accomplishments during his or her work experience. These accomplishments might include a broad range of thematic outcomes or outcomes that focus on a specific project in which the student needed to employ a variety of skills and knowledge in the solution of a problem or situation encountered in the workplace. Panel members focus on how well the student can integrate conceptual knowledge, "hands-on" skills, and practical, acquired experiences related to the project topic. The panel provides "on-the-spot" evaluation and meaningful developmental feedback to the student. Of course, panel members must employ fairness, equity, and consistency in their evaluation and must make sure agreed upon standards are applied equally to all students.

Thus, the review panel serves as a formal team that assists in clarifying and assessing connections the student has made between school-based learning and the application of that learning in the workplace. The participation of business, industry, and community representatives on

project review panels strengthens the "buy-in" for alternative or authentic assessments within the broader community.

Small Group Seminars

Small group seminars can be useful vehicles for students to meet as a group on a regular basis to share and discuss their workplace experiences. The seminar may be led by the students themselves on a rotating basis. As appropriate, a teacher, a workplace mentor, or a team composed of school and business or industry representatives, might serve as seminar leaders. The seminars can involve unstructured activities such as discussing the implications of daily workplace experiences and/or strengthening students' interpersonal and work-related skills. Seminars may also be structured to focus on one or more broad aspects of the workplace. For example, discussion might take place focusing on how work is organized and how people behave and relate to each other in these work settings. Social issues and problems in the workplace and their legal ramifications may also be discussed (Grubb & Badway, 1995). The small group seminar can be a multipurpose strategy since it allows students to develop speaking, listening, and sharing skills as they interact with others about their workplace experiences. It also strengthens interpersonal interactions and relationships in small group processes. The seminar is a useful teaching/learning strategy that helps reinforce connections between the less formal workplace setting and the more formal school setting.

"The small group seminar can be a multipurpose strategy since it allows students to develop speaking, listening, and sharing skills as they interact with others about their workplace experiences."

Summary

Several organizational models and strategies can assist in aligning the thematic curriculum with school-based learning, work-based learning, and connections between the school and the workplace. School-based teaching/learning may be enhanced by including content and subject integration in instruction. More commonly used integration teaching/learning models focus on relationships within, between, and across teacher and student groups. Several interactive teaching/learning strategies that engage students in meaningful school-based activities include small group activities, cooperative group projects, case studies, and simulations. In terms of the workplace, incidental, informal, and formal learning that occurs in

students' performance of workplace activities can be processed and given greater meaning by using cognitive strategies ranging from individual interaction to group verification.

Teaching/learning strategies that help students to make connections between the school and the workplace are also available. They include clinical interviews, student logs and journals, project panel reviews, and small group seminars. The selection of these and other strategies is dependent on the school and workplace environment, the level of student ability and interest, and time and instructional resources available to the teacher. Creative application of teaching/learning strategies to school-based and work-based instructional settings as well as settings where the school and the workplace are connected have potential to make the thematic curriculum come alive for students as they prepare for life and living.

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SECTION 8

Assessing and Refining the Curriculum

Introduction

Is the thematic curriculum doing what it is intended to do? What positive impact does an "all aspects" base have? How might career clusters be refined? These are only a few of the many questions that may be posed about curricula. Unfortunately, educators and others may spend so much time creating and implementing a curriculum that little time is left to assess it. Realistically, many curricula are never adequately assessed. Some of the more common reasons given for not assessing a curriculum include "We just don't have time to do it," "The thematic curriculum is too complex to assess properly," and "We have no idea how to conduct a curriculum assessment." Although these are relevant concerns, they fail to consider why it is important to assess the curriculum.

There are several reasons for assessing the thematic curriculum. They include (1) considering possible areas of curriculum improvement; (2) considering whether the curriculum's benefits are worth the investment; and (3) deciding whether to keep the curriculum as it is, to modify it, or to eliminate it. The first two reasons relate most closely to curriculum improvement concerns. Given the thematic curriculum's broad scope, curriculum developers; teachers; students; parents; business, industry, community representatives; and others may have differing views of what the curriculum is and what it should be. Thus, when considering curriculum improvements and benefits, it is important to be sensitive to this wide range of views. The third reason for assessment involves administrators' and other policymakers' participation in deciding whether the curriculum will remain as is, be revised, or be eliminated. Policy decisions may or may not give consideration to curriculum improvement. Since these three reasons reflect a progression from improvement to possible loss, it is easy to see how assessment fits into the picture. If curriculum assessment is begun early in the development process and shortcomings are identified, changes can be made more easily and the curriculum may not need major revision. However, if assessment is ignored, the curriculum may ultimately need to undergo major change or, worse yet, be eliminated.

In this section, a brief introduction to thematic curriculum assessment is provided, followed by a description of the assessment process. Also included are ways that assessment information can be used for curriculum improvement.

Assessment: An Overview

What is assessment and how does it relate to the thematic curriculum? Basically, assessment may be viewed as determining the curriculum's value or worth. Central to assessment is the process of making informed decisions; that is, using assessment information to determine whether the curriculum is of acceptable quality and, if not, what must be done to make it acceptable. One of the more popular ways to view curriculum assessment or evaluation is to consider it as having two stages: formative and summative (Ornstein & Hunkins, 1988).

Figure 8-1. Questions Related to Formative Assessment

- Have the most meaningful contextual options been selected?
- Have the most meaningful organizational options been selected?
- Have the most meaningful delivery options been selected?
- Have the most meaningful content options been selected?
- Have the curriculum and its component parts been offered to students in meaningful and effective ways?
- To what extent is the curriculum accepted and used by teachers?
- To what extent do students accept the curriculum and learn from it?

Formative assessment focuses on the improvement of a curriculum as it is being developed. Emphasis is placed on determining how the curriculum and its component parts may be improved during the development process. For example, results of career cluster curriculum pilot testing at a high school may reveal that objectives are not sequenced properly or that some teachers are having difficulty understanding their respective roles in the team-teaching process. Formative assessment can help ensure these problems are identified and corrected early in the curriculum's development rather than after the curriculum has been fully implemented. Several examples of questions for which answers may be obtained during the formative assessment stage are listed in Figure 8-1.

Figure 8-2. Questions Related to Summative Assessment

- How well do curriculum components work together to create a high-quality curriculum?
- What impact does the curriculum have on teachers, students, graduates, parents, the community, the workplace, and others?
- To what extent is the curriculum better than what it has replaced?
- What are the curriculum's unintended benefits?
- How can the curriculum be improved to make it even better than it is?

Summative assessment has the fully operational curriculum as its main focus. This assessment is designed to obtain a holistic view of the implemented thematic curriculum. Emphasis is placed on determining the curriculum's cumulative impact. So, for example, after a career

cluster focusing on all aspects of manufacturing has been implemented in a high school, the cluster should be examined to determine how it fares as a whole. Representative summative assessment questions that might be asked are highlighted in Figure 8-2.

Formative and summative assessment are not meant to be one-shot tasks. They are ongoing activities initiated early in the curriculum development process and conducted on a continuing basis throughout the curriculum's life. Assessment applied at regular intervals is one of the keys to creating and maintaining high-quality curricula.

Gathering and Examining Assessment Information

The assessment process typically consists of several sequential steps (Finch & Crunkilton, 1993; Levesque, Bradby, & Rossi, 1996; Ornstein & Hunkins, 1988):

1. Determining the Assessment Focus
2. Obtaining Assessment Information
3. Examining the Assessment Information
4. Using Assessment Information for Curriculum Improvement

Each of these steps is described below:

Determining the Assessment Focus

The assessment process is typically driven by important concerns people have about the curriculum's "impact." Kirkpatrick (1994) describes impact as having four levels: (1) reaction, (2) learning, (3) behavior, and (4) results.

Assessment at *Level 1 (reaction)* focuses on how persons associated with the curriculum (e.g., students, teachers, employers, community representatives) react to it. Kirkpatrick refers to this as a measure of customer satisfaction. If "customers" are not happy with the curriculum, it may have no future regardless of its quality.

Figure 8-3. Levels of Curriculum Impact: Abbreviated Examples

Curriculum Focus	Assessment Level 1: Reaction	Assessment Level 2: Learning	Assessment Level 3: Behavior	Assessment Level 4: Results
Engineering & Technology Cluster	Students react favorably to the emphasis on all aspects of a field	Students can distinguish among the various careers in the cluster	Students enroll and succeed in higher-level math courses	Graduates more education career available
Agricultural Sciences Career Major	Teachers feel positive about working together to teach the major	Students recognize that there are many opportunities to work in the field	Enrollment in the major results in increased science test scores	Graduates apply they have learned to workplace
Arts and Communication Academy	Parents appreciate the broad exposure their children are getting to the field	Students can describe aspects of the field's competitive nature	Students develp a much greater interest in studying English	Graduates able to more career choices

Level 2 (learning) emphasizes "the extent to which participants change attitudes, improve knowledge, and/or increase skill" (p. 22) by participating in the curriculum. This level of assessment focuses primarily on students but could easily include others as well.

Level 3 (behavior) addresses the extent to which change in behavior has occurred among participants. Assessment at this level is directed toward applied behavior change. For some students, this may mean change is assessed in work-based learning settings. For other students, assessment of change may take place in school-based learning settings. Again, this assessment level may apply to others.

At *Level 4 (results)*, a determination is made about the curriculum's overall outcomes. This is at once the most beneficial and the most difficult area to assess. Examples of results that might be assessed include reduced student dropout rates, increased higher education and/or employment options for students, graduates' increased satisfaction with their schooling, and improved communication among teachers. Figure 8-3 includes levels of impact examples for three different thematic curricula.

These examples provide a better feeling for the impact a curriculum may have. However, when determining the assessment focus, it is best to state curriculum outcomes as specifically as possible. Otherwise, those who conduct the assessment may have little idea if the curriculum has been successful or unsuccessful. Three examples of the same outcome for students enrolled in a thematic curriculum are presented for review:

1. Students' mathematics and science achievement will improve.
2. Students' mathematics and science achievement test scores will improve by the end of the first year.
3. By the completion of their first full year in the curriculum, students will, on average, score 15% higher on districtwide mathematics and science achievement tests than they did at the beginning of the school year.

Even though these three outcome examples all focus on student achievement, they range from example one which is quite vague to a more specific example two and finally to an even more specific example three. Since the third example provides more specific information about what is expected, it is both easier to assess and to defend. Therefore, it is recommended that curriculum outcomes be prepared so they reflect example three's characteristics.

Obtaining Assessment Information

The assessment information gathered is a function of the level being examined (i.e., reaction, learning, behavior, results) and the expectations people have for the curriculum (i.e., outcomes). To be most effective, methods used to gather information should be compatible with assessment levels and peoples' expectations. Curriculum assessment information may, therefore, be gathered in a variety of ways. Assessment information falls into two distinct yet interrelated categories: (1) quantitative and (2) qualitative. Quantitative information consists of "hard" information such as numbers, scores, means, and standard deviations; whereas, qualitative information includes "soft" information such as interview text and responses to open-ended questions (Brainard, 1996, p. 11). Provided in Figure 8-4 are several examples of ways assessment information may be gathered.

If reaction information is needed, it might be obtained via carefully developed questionnaires, personal interviews, or a combination of the two. Information about learning, behavior, and results may be somewhat more difficult to gather. This might require obtaining information about student and/or faculty member change over time, a task that includes taking into account factors that may cause the assessment results to be invalid. Or it might demand that detailed observations are made to gather information about the settings in which learning is taking place.

Examining the Assessment Information

If assessment information is linked to expectations of what the curriculum should be, the information examination task can be relatively easy. For example, say that after three years of operation, a travel and tourism academy in a high school is expected to effect a 20% lower student dropout rate. If student dropout information has been collected at certain points in time and potentially confounding factors have been accounted for, it should be relatively easy to see if the curriculum has had impact on the student dropout rate. If it is anticipated that business and management academy graduates at that same high school will be better prepared for both higher education and employment, information about these graduates, and perhaps a comparison group, must be gathered and arrayed in a ways that it can be seen whether the expectation has, in fact, been realized. In sum, assessment information should be gathered and organized so it can be easily compared with expectations.

Figure 8-4. Examples of Ways Assessment Information May Be Gathered

Quantitative Data Sources
- Surveys (questionnaires, opinion polls)
- Rating scales
- Checklists
- Delphi technique

Qualitative Information Sources
- Structured interviews
- Focus groups
- Nominal group process (Brainard, 1996, p. 27)

Using Assessment Information for Curriculum Improvement

Discrepancies that exist between *what is* and *what should be* (see Figure 8-3) serve as starting points for curriculum improvement. If discrepancies emerge during the formative assessment of a thematic curriculum, they may point to changes that should be made before the curriculum is fully implemented. Shortcomings such as a lack of teacher and student satisfaction with the curriculum, teacher resistance to change, and lack of collaboration from employers may each need to be dealt with in a different way. Deciding which changes to make and making them can result in meaningful curriculum improvements. Assessing the curriculum during its formative development and making necessary adjustments is much easier than completing them after the curriculum is fully operational.

Results of summative assessment can confirm that the curriculum development process has been successful or point out what changes should be made before it can be called a success. Since summative assessment focuses on the entire curriculum, deficiencies identified at this point in time may be difficult to translate into meaningful changes. For instance, if

assessment reveals that some students are not learning certain content as rapidly as anticipated, this deficiency may not point directly to what should be changed. Detective work may be needed such as determining which students are not learning the content and why they are not learning it. This, in turn, can assist in discovering what portions of the curriculum should be changed or, perhaps, determining if it is a teaching problem rather than or in addition to a curriculum problem.

One of the more interesting aspects of summative assessment focuses on discovering unintended curriculum outcomes. Who knows what will be uncovered in this area? Such a search may not identify anything or it may reveal the curriculum has a variety of unintended benefits that reflect a major return on the curriculum development investment. For example, an examination of career cluster curricula in a high school might reveal that, even though not identified as an intended outcome, students' career decisionmaking skills have improved.

Summary

Although assessment is a very important element of thematic curriculum design and implementation, it is often ignored or delayed until very late in the development process. Curriculum assessment can be conducted in two stages—formative and summative—with formative assessment focusing on improving the curriculum as it is being developed and summative assessment focusing on the total curriculum after it has been developed. Both formative and summative assessments should be planned early in the curriculum development process and continue on a regular basis throughout the curriculum's life.

The assessment process typically includes determining the assessment focus, obtaining assessment information, examining the assessment information, and using the information for curriculum improvement. Comprehensive assessment can focus on one or more impact levels: reaction, learning, behavior, and results. When assessment information is gathered and examined in a comprehensive and systematic fashion, the improvement process is made much easier. Thus, for improvement to be maximally effective, changes should be made during both the formative and summative assessment stages.

References

Brainard, E. A. (1996). *A hands-on guide to school program evaluation.* Bloomington, IN: Phi Delta Kappa Foundation.

Finch, C. R., & Crunkilton, J. R. (1993). *Curriculum development in vocational and technical education: Planning, content, and implementation* (4th ed.). Needham Heights, MA: Allyn & Bacon.

Kirkpatrick, D. L. (1994). *Evaluating training programs: The four levels.* San Francisco: Berrett-Koehler.

Levesque, K., Bradby, D., & Rossi, K. (1996, May). Using data for program improvement: How do we encourage schools to do it? *Centerfocus* (issue #12).

Ornstein, A. C., & Hunkins, F. P. (1988). *Curriculum: Foundations, principles, and issues.* Englewood Cliffs, NJ: Prentice-Hall.

Appendices

Appendix A
Examples of Themes

Appendix B
Examples of Content Organized Around Themes

Appendix C
Examples of Career Clusters/Pathways/Majors

Appendix D
Examples of Theme-Wide Functions, Issues, Concerns, and Technological Knowledge and Skills

Appendix E
Related Materials, Reports, and Resources: A Selective Bibliography

Note: These appendices contain representative examples to assist in designing a thematic curriculum. They are *not* intended to be exhaustive source lists. Examples may have been revised, updated, or otherwise changed since this document was published.

APPENDIX A

Examples of Themes

A.1 – Connecticut

A.2 – Dictionary of Occupational Titles

A.3 – Gnaedinger Taxonomy

A.4 – Indiana

A.5 – Sweden

A.6 – Wisconsin

A.1 *Connecticut*

To address the career exploration and school-based experience components in Connecticut's curriculum, skill committees led by industry experts established career clusters and industry skill standards specific for each cluster. These standards direct local and state curriculum development and applied work-based learning at the secondary level.

- Arts and Media
- Business and Finance
- Construction Technologies and Design
- Environmental, Natural Resources, and Agriculture
- Government, Education, and Human Services
- Health and Biosciences
- Retail, Tourism, Recreation, and Entrepreneurial
- Technologies: Manufacturing, Communications, and Repair

Source

CBIA Education Foundation. (1997). *Career cluster booklets*. Hartford, CT: Author.

A.2 *Dictionary of Occupational Titles (DOT)*

The *DOT* is a useful source of information about industries and fields. In the DOT, occupations are grouped according to nine broad categories:

1. **Professional, Technical, and Managerial Occupations**
   Included in this category are occupations concerned with theoretical or applied aspects of such fields as arts; sciences; engineering; education; medicine; law; business relations; and administrative, managerial, and technical work. Most of these occupations require substantial educational preparation (usually at the college or technical institute level). Examples include architectural occupations and electrical engineering occupations.

2. **Clerical and Sales Occupations**
   Clerical occupations are concerned with compiling, recording, communicating, computing, and otherwise systematizing data. Clerical occupations associated with the manufacturing process are excluded. Examples include legal secretary, clerk typist, and caption writer. Sales occupations include occupations concerned with influencing customers' favor of a commodity or service. These occupations are closely identified with sales transactions even though they do not involve actual participation.

3. **Service Occupations**
This category includes occupations concerned with performing tasks in and around private households; serving individuals in institutions and commercial and other establishments; and protecting the public against crime, fire, accidents, and acts of war. Examples include caretaker, waiter/waitress, and firefighter.

4. **Agricultural, Fishery, Forestry, and Related Occupations**
These occupations focus on propagating, growing, caring for, and gathering plant and animal life products. Also included are occupations focusing on related support services; logging timber tracts; catching, hunting, and trapping animal life; and caring for parks, gardens, and grounds. Excluded are occupations requiring a primary knowledge or involvement with technologies such as processing, packaging, and stock checking. Examples include farmworker, vine pruner, and park ranger.

5. **Processing Occupations**
This category of occupations is concerned with refining, mixing, compounding, chemically treating, and heat treating work materials and products. Knowledge of a process and adherence to a formula or to other specifications are required to some degree. Vats, stills, ovens, furnaces, mixing machines, crushers, grinders, and related equipment or machines are usually involved. Examples include plating inspector, cylinder grinder, and electro-plating laborer.

6. **Machine Trade Occupations**
Occupations in this category focus on the operation of machines that cut, bore, mill, abrade, print, and similarly work such materials as metal, paper, wood, plastics, and stone. Complicated jobs require an understanding of machine functions, blueprint reading, mathematical computations, and exercising judgment to conform to specifications. Eye-hand coordination may be the most significant factor in less complicated jobs. Installation, assembly, repair, and maintenance of machines and mechanical equipment, and weaving, knitting, spinning, and similarly working textiles are included. Examples include machinist and mechanic.

7. **Benchwork Occupations**
These occupations are concerned with the use of body members, hand tools, and bench machines to fit, grind, carve, mold, paint, sew, assemble, inspect, repair, and similarly work relatively small objects and materials. The work is usually performed at a set position in a mill, plant, or shop, at a bench, worktable, or conveyor. At the more complex levels, workers frequently read blueprints, follow patterns, use a variety of handtools, and assume responsibility for meeting standards. Workers at less complex levels are required to follow standardized procedures. Examples include silversmith, jeweler, and solderer.

8. **Structural Work Occupations**
Structural work occupations are concerned with fabricating, erecting, installing, paving, painting, repairing, and similarly working structures or structural parts such as bridges, buildings, roads, transportation equipment, cables, girders, plates, and frames. The work generally occurs outside a factory or shop environment, except for factory production line occupations concerned with fabricating, installing, erecting, or repairing structures. Handtools or portable power tools, and such materials as wood, metal, concrete, glass, and clay are used. Stationary machines are frequently used in structural work occupations, but they are secondary in importance to handtools and portable power tools. Workers are frequently required to have knowledge of the materials with which they work regarding stresses, strains, durability, and resistance to weather. Examples include riveter, chimney constructor, and machine assembler.

9. Miscellaneous Occupations

This category includes occupations concerned with transportation services, packaging and warehousing, utilities, recreation, and motion picture services, mining, graphic arts, and various miscellaneous activities listed above involving extensive recordkeeping. Examples include movie producer, truck supervisor, and graphic artist.

Source

U.S. Department of Labor Employment and Training Administration. (1991). *Dictionary of occupational titles* (4th ed.). Lanham, MD: Bernan.

A.3 *Gnaedinger Taxonomy*

The Gnaedinger Taxonomy divides the United States economy into 16 industries for purposes of providing career education to high school students. The taxonomy strives to capture all aspects of the legal, paid economy around which the curriculum of an entire school or school-within-a-school could be organized. This industry-based approach to curriculum provides a wide learning context and avoids narrow specialization. The industries are as follows:

- Agriculture
- Healthcare
- Arts, Culture, and Religion
- Hospitality
- Built Environment*
- Insurance
- Communication
- Manufacturing
- Education
- Natural Resources
- Energy
- Personal and Business Services
- Finance
- Retailing and Wholesaling
- Government
- Transportation

* This program is intended for any student interested in *some* aspect of the building industry—including the building trades, architecture, interior design, planning, housing policy, and construction technology.

Source

Hoachlander, E. G. (1994). Industry-based education: A new approach for school-to-work transition. In Office of Educational Research and Improvement, U.S. Department of Education, *School-to-Work: What does the research say about it?* (pp. 57-74). Washington, DC: Office of Educational Research and Improvement.

A.4 *Indiana*

Indiana has identified the following fourteen career clusters as a basis for organizing career and occupational information, data collection, and curriculum and instruction:

- Agriculture and Natural Resources
- Art, Media, Communications, and Fine and Performance Arts
- Engineering, Science, and Technologies
- Manufacturing and Processing
- Mechanical Repair and Precision Crafts
- Business Management and Finance
- Building and Construction
- Educational Services
- Health Services
- Personal and Commercial Services
- Legal, Social, and Recreation Services
- Protective Services
- Marketing, Sales, and Promotion
- Transportation

Source

http://www.dwd.state.in.us/html/teched/clusgrid.html or http://icpac.indiana.edu/munger/clusters.html

A.5 *Sweden*

Recent efforts by The Swedish National Agency for Education to reorganize the upper secondary curriculum around industries and fields resulted in the identification of 16 national programs. Programs identified include the following:

- Child Recreation
- Hotel, Restaurant and Catering
- Food
- Construction
- Business and Administration
- Energy
- Social Sciences
- Health Care
- Arts
- Vehicle Engineering
- Natural Resources
- Handicrafts
- Natural Sciences
- Industrial
- Media
- Electrical Engineering

Source

National Agency for Education. (1992). *The new upper secondary school.* Stockholm, Sweden: Author.

A.6 *Wisconsin*

In conjunction with area high schools and the University of Wisconsin system, School-to-Work specialists have identified the following career clusters in future job markets. Career Cluster Maps, obtained from high school counselors, guide students in planning a year-by-year academic program related to a chosen job cluster. Maps indicate high school credit requirements of the state and MATC degree and diploma requirements.

- Agriculture / Natural Resources
- Arts / Communications
- Business / Management
- Health Services
- Human Resources
- Industrial / Engineering / Technology

Source

http://www.nde.state.ne.us/NMSI/tQ2/careerquest.html

APPENDIX B

Examples of Content Organized Around Themes

B.1 – Manufacturing/Production Content

B.2 – Marketing Content

B.3 – Technology Content

B.4 – Agriculture Content

B.5 – Health Care Content

B.6 – Business Content

B.7 – Natural Resources Content

B.8 – Construction Content

B.9 – Communication Content

B.10 – Transportation Content

B.1 *Manufacturing/Production Content*

- Manufacturing concepts and processes
- Designing and engineering products/materials/structures
- Developing manufacturing systems
- Computer-Aided Design (CAD)
- Computer-Aided Manufacturing (CAM)
- Processes such as casting, molding, welding, forming, separating, conditioning, assembling, building, installing, and finishing
- Management and financial activities/responsibilities (obtaining a loan, raising funds, and so on)
- Establishing a manufacturing organization
- Marketing strategies
- Production management

Sources

Economos, C. (1994). *What's up in factories? Exploring the new world of manufacturing.* New York: Thirteen WNET.

Wright, R. T., & Henak, R. M. (1993). *Exploring production.* Tinley Park, IL: Goodheart-Willcox.

B.2 *Marketing Content*

- Implementing the marketing concept
- Elements and effectiveness of marketing strategies
- Identifying and coordinating marketing and business functions
- Marketing impact on businesses, individuals, and society
- Encouraging the social responsibility/ethical behavior of businesses and employees
- Examining the private enterprise economy
- Evaluating the role of competition
- Studying international trade/products/market
- Evaluating market potential and calculating market share
- Measuring consumer behavior and satisfaction
- Marketing research/methods of data collection/information systems
- Developing a marketing plan
- Developing a new product

- Evaluating service/product quality
- Purchasing procedures/records
- Planning effective distribution and promotion of products and services
- Pricing procedures
- Examining the communication process elements
- Introducing the selling process
- Identifying and managing market risk
- Planning and management
- Measuring technological impact

Source

Burrow, J., & Eggland, S. (1995). *Marketing foundations and functions*. Cincinnati: South-Western.

B.3 *Technology Content*

- Technology system types and components
- Technological processes
- Production and measurement tools in technology
- Design process
- Product and structure production
- Technological systems management
- Automation/Robotics
- Social response to technological change
- Light, laser, and fiberoptics
- Graphic communications
- Photography
- Telecommunications
- Research and development
- Desktop publishing
- Manufacturing enterprises
- Control systems
- Alternate energy systems
- Production systems
- Bio-related technical systems

Sources

Barbato, S. A. (1990). *Technology ed curriculum standard K-12* (Rev. ed.). Dover: Delaware Department of Public Instruction, Vocational Education Division. (ERIC Document Reproduction Service No. ED 336 272)

Fales, J. F., Kuetemeyer, V. F., & Brusic, S. A. (1993). *Technology today and tomorrow* (2nd ed.). Peoria, IL: Glencoe/McGraw-Hill.

Gradwell, J., Welch, M., & Martin, E. (1996). *Technology: Shaping our world*. Tinley Park, IL: Goodheart-Willcox.

B.4 *Agriculture Content*

- Delivery methods
- Product and market trends
- Family-owned businesses
- Capitalization methods
- Accounting/budget allocation/recordkeeping methods
- Business liability and protection costs
- Company bids
- Materials purchasing
- Negotiation/communication skills
- Time management techniques
- Human relations—customers/suppliers/employees
- Ecology/conservation
- Agricultural business management techniques
- Agricultural mechanics
- Agricultural law
- Off-farm agricultural businesses
- Merchandising/marketing/sales techniques
- Agricultural machinery and equipment maintenance and repair
- Dealership organization
- Use of selected hand tools, precision measuring tools, and testing equipment
- Safety regulations and procedures
- Operating procedures in a parts department
- Mechanical power transfer systems
- Metal fusion and fabrication welding

Sources

Commonwealth of Virginia. (1994). *Guide to vocational program planning in Virginia*. Richmond: Department of Education, Division of Instruction, Office of Vocational, Adult, and Employment Training Services, Author.

Missouri Department of Elementary and Secondary Education. (1993). *Methodology used in the project "All Aspects of the Industry" for vocational education programs*. Columbia: University of Missouri, Instructional Materials Lab. (ERIC

Document Reproduction Series No. ED 367 818)

B.5 *Health Care Content*

- Health care terminology
- Principles of body functions and mechanics
- Nutritional needs of patients
- Fundamentals of wellness
- Treatment of diseases process
- Client status evaluation
- Documentation, report writing
- Patient safety procedures
- Aseptic procedures
- Body mechanics for positioning, transferring, and transporting clients
- Infection control (universal precautions)
- Internal and external communication
- Information systems use
- Laboratory skills
- Legal responsibilities, limitations, and implications of actions
- Ethical practices
- Resource management

Sources

Badasch, S. A., & Chesebro, D. S. (1993). *Introduction to health occupations* (3rd ed.). Englewood Cliffs, NJ: Regents/Prentice-Hall.

Health Resources and Services Administration. (1995). *Core curricula in allied health.* Washington, DC: U.S. Department of Health and Human Services.

B.6 *Business Content*

- Researching hardware and software needs
- Planning/expanding Local Area Network (LAN)
- Acquiring hardware and software
- Providing and improving customer services
- Installing, testing, and maintaining computer network
- Performing communication functions
- Disseminating information
- Operating as a team member
- Complying with company and government regulations
- Conducting human resource services
- Performing work station functions
- Performing documentation functions
- Managing security and integrity
- Performing legal and ethical functions
- Providing user training and support
- Performing management functions
- Managing client/customer service
- Managing business operations
- Managing financial matters

Source

Virginia Community College System. (1996). *Occupational analyses: Business cluster.* Richmond: Virginia Vocational Curriculum and Resource Center, Author.

B.7 *Natural Resources Content*

- Performing investigative/analytical functions
- Performing collection functions
- Performing monitoring equipment functions
- Managing waste
- Preserving natural resources
- Performing resource management functions
- Resolving environmental problems
- Performing communication functions
- Producing, maintaining, harvesting, processing, and distributing natural resources
- Conserving air, soil, and water
- Protecting and managing forests and wildlife
- Planning outdoor recreation
- Planning and operating campgrounds, hiking and riding trails, riding stables, marinas, vacation farms, and farm ponds
- Managing soil and water systems
- Developing human relations skills
- Developing leadership skills
- Organizing, operating, and evaluating landscape operations and landscape technology programs

Sources

Heimlich, J. E. (1993). *Environmental studies and environmental careers*. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education.

Florida State University. (1989). *Landscape operations and landscape technology*. Tallahassee, FL: Center for Instructional Development and Services.

Virginia Community College System. (1996). *Occupational analyses: Agriculture/natural resources*. Richmond: Virginia Vocational Curriculum and Resource Center, Author.

B.8 *Construction Content*

- Preparing for the construction project
- Designing and planning the project
- Managing construction activities
- Materials and specifications
- Print reading
- Sitework
- Structural steel construction
- Reinforced concrete construction
- Mechanical and electrical systems
- Finishing the project
- Closing the contract

Sources

Galera, M. (1996). From school to a career in construction. *Tech Directions*, 55(7), 16-18.

Henak, R. M. (1993). *Exploring construction*. Tinley Park, IL: Goodheart-Willcox.

Toenjes, L. P. (1996). *Building trades printreading – Part 3: Heavy commercial construction*. Homewood, IL: American Technical Publishers.

B.9 *Communication Content*

- Communication processes
- Industries and careers
- Technical graphics
- Graphic design and production
- Design and problem solving
- Computer-Aided Design (CAD)
- Data processing
- Desktop/electronic publishing
- Continuous tone photography
- Electronic communication basics
- Telecommunication and broadcasting
- Specialty printing and reprography
- Technological impacts
- Communication field careers
- Future communication

Sources

Johnson, C. D. (1992). *Communication systems*. Tinley Park, IL: Goodheart-Willcox.

Seymour, R. D., Ritz, J. M., & Cloghessy, F. A. (1996). *Exploring communication*. Tinley Park, IL: Goodheart-Willcox.

B.10 *Transportation Content*

- Energy and power systems
- Land transportation systems
- Water transportation systems
- Air transportation systems
- Space transportation systems
- Propulsion of a vehicle
- Guidance and control of a vehicle
- Transportation and the future

Sources

Bohn, R. C. (1992). *Energy technology: Power and transportation*. Peoria, IL: Glencoe/McGraw-Hill.

Johnson, S. R., & Farrar-Hunter, P. A. (1993). *Exploring transportation*. Tinley Park, IL: Goodheart-Willcox.

APPENDIX C

Examples of Career Clusters/Pathways/Majors

C.1 – Central High School Magnet Career Academy (Louisville, Kentucky) Career Area Veterinary Science Curriculum

C.2 – Dauphin County Technical School (Harrisburg, Pennsylvania)

C.3 – David Douglas High School (Portland, Oregon)

C.4 – Fairfax County Public Schools (Fairfax, Virginia) Career Cluster Engineering Curriculum

C.5 – Philadelphia High School Academies (Philadelphia, Pennsylvania)

C.6 – Walhalla High School (Walhalla, South Carolina)

C.7 – William Turner Technical High School (Miami, Florida)

C.8 – Additional Schools

C.1 *Central High School Magnet Career Academy*

Louisville, Kentucky

- Computer Technology
- Legal/Governmental Services
- KFC/JCPS Partnership/Young Executive Management Program
- Finance Accounting
- Business Management/Entrepreneurship
- Medicine/Allied Health
- Nursing
- Dental
- Medical Office Administration
- Therapeutic/Pharmacy
- Diagnostics/Clinical Lab Science
- Veterinary Science

Ninth graders must complete an application to the Magnet programs, provide two letters of recommendation, and submit an essay on career choice. Every ninth grader rotates through each of the magnet areas (three weeks duration) and declare a major at the end of the year. *All* ninth graders enter a pre-college curriculum *and* develop a career plan.

In tenth grade, students declare their career major and begin an in-depth study of the magnet area. Hands-on training in this magnet area is received in a "high tech" learning lab. Sophomores shadow a worker in their chosen field for five hours per semester, for a total of ten hours per school year. Each student participates in enrichment field trips, personal development training, and career development and educational

training. Students keep logs of their experiences.

Juniors study one hour per day in their chosen magnet area. Approximately once a month, students work one-on-one with a mentor from a particular field. Site visits, hands-on training, professional contacts, and personal development training continue throughout the school year. Juniors take the ACT/SAT and begin to research and contact colleges. Students continue to keep logs of their experiences.

Seniors study two hours per day in their chosen magnet field. Students have the opportunity to participate in a work experience co-op for 15-20 hours per week (one class period) outside school. This co-op is both for pay and academic credit. Students continue to work on a monthly basis with their mentor, and prepare their career magnet portfolio to use on work and college interviews. They apply to colleges and for scholarships. A special certificate is awarded at the completion of their Career Magnet Program. All curriculum sequences are available at regular, honors, and advanced program levels.

Magnet Career Area Curriculum Veterinary Science (Advanced Program Level) Central High School

Grade 9
English
AP Math
Biology I
Physical Education/Keyboarding
Foreign Language
Magnet Rotation
- Demonstrate an interest in Veterinary Science
- Maintain a 2.5 GPA
- Demonstrate an interest in Veterinary Community involvement
- Select Veterinary Science as major area of study

Grade 10
English
AP Math
Biology II
World Civilization
Foreign Language
Veterinary Science
- Sign Contract of Intent
- Clinical Procedures I
- Parasitology
- Breeds Identification
- Zoonotic Diseases
- Involvement in grooming and physical exams during Clinical Days

Grade 11
English
AP Math
Chemistry I
U.S. History
Foreign Language
Veterinary Science
- Clinical Procedures II
- Laboratory Techniques
- Small Animal Diseases
- Medical Terminology
- Performing physical exams and laboratory work during Clinical Days
- Receive certificate as a Small Animal Nutritional Advisor

Grade 12
English
Humanities
Calculus
Anatomy and Physiology
Veterinary Science (2 hours)
- Clinical Procedures III
- Surgical Nursing
- Large Animal Diseases
- Animal Science (3 college credit hours)
- Work Site Preparation

Source: Central High School Magnet Career Academy. (1995). Information brochure. Louisville, KY: Author.

Source

Central High School Magnet Career Academy. (1995). *Information brochure.* Louisville, KY: Author.

C.2 *Dauphin County Technical School*

Harrisburg, Pennsylvania

- Technical
- Service
- Communications and Transportation
- Construction

Technical Cluster

- Electronic Technology Health Assistant
- Scientific Data Processing Technology
- Drafting and Design Technology
- Law Enforcement

Service Cluster

- Childcare Attendant
- Cosmetology
- Food Production, Management and Services
- Marketing and Distributive Education
- Ornamental Horticulture

Communications and Transportation Cluster

- Precision Metalworking
- Automotive Body and Fender
- Automotive Technology I
- Graphic Arts
- Commercial Arts

Construction Cluster

- Air Conditioning and Refrigeration
- Building Construction and Maintenance
- Carpentry
- Electronic Construction and Maintenance

Source

Dauphin County Technical School. (1995). *Information brochure.* Harrisburg, PA: Author.

C.3 *David Douglas High School*

Portland, Oregon

- Social and Human Services
- Health Sciences
- Business and Management
- Industrial and Engineering Systems
- Natural Resources
- Arts and Communications
- Hospitality, Tourism, and Recreation

A partnership between David Douglas High School and the Oregon Business Council resulted in the development of Project STARS (Students Taking Authentic Routes to Success), designed to respond to the educational reform demands of the Oregon Education Act for the 21st Century. Interdisciplinary teams have been established to develop curriculum, set policy, and determine how to best serve the students enrolled in their career "constellation." Teams consist of representatives from each educational department or discipline and three to five business persons working in a related career.

Eighth-grade students complete an interest and career aptitude survey, and review brochures on each of the constellations. Ninth- and tenth-grade students complete a careers course which explores options within various constellations, and develop individual education plans and portfolios. Ninth and tenth graders focus on general studies and receive a Certificate of Initial Mastery. Eleventh- and twelfth-grade students focus on a major area of study and receive a demonstration-based Certificate of Mastery in one of the six broad areas. Students also participate in supervised workplace experiences with cooperating business partners.

Source

McGraw-Hill. (1996). *New American high schools: Preparing students for college and careers.* New York: Author.

C.4 *Fairfax County Public Schools*

Fairfax, Virginia

- Communications and the Arts
- Engineering, Industrial and Scientific Technology
- Health, Human and Public Services
- Business and Marketing

Under this cluster plan, most core academic classes are taken in ninth and tenth grade. By twelfth grade, five of seven classes should be specialized courses from the cluster curriculum a student has chosen. There are many potential course combinations within the four career clusters listed below:

Communications and the Arts
- Photography
- Public Relations
- Radio
- Journalism
- Visual Arts
- Virtual Reality
- Interactive Multimedia
- Television
- Film
- Live Performance

Engineering, Industrial and Scientific Technology
- Architecture
- Electronics
- Engineering
- Automotive
- Manufacturing
- Building Trades
- Horticulture
- Transportation
- Construction
- Physical Science

Career Cluster Curriculum – Engineering Focus
Fairfax County Public Schools

Ninth Grade
- Language Arts
- P.E. and Health
- World Studies I
- Math (Algebra I or II)
- Science (Earth Science or Biology)
- Introduction to Engineering*
- Engineering Drawing*

Tenth Grade
- Language Arts
- P.E. and Health
- Social Studies or Foreign Language
- Fine or Practical Arts
- Math (Algebra II or Geometry)
- Science (Biology or Chemistry)
- Principles of Technology*

Eleventh Grade
- Language Arts
- U.S. History
- Math or Science
- Design and Technology*
- Desktop/Multimedia Presentations*
- Information Systems*
- Electronics*

Twelfth Grade
- Language Arts
- U.S. Government
- Media Focus 2-D*
- Computer Graphics*
- Discrete Mathematics*
- Speech Communications*
- Business Management*

*denotes cluster curriculum course

Source: Lozada, M. (1995). A model reform. *Vocational Education Journal, 70*(8), 28-33.

Health, Human and Public Services

- Education
- Counseling
- Health Care
- Child Care
- Dental
- Hotel
- Government
- Law
- Consumer Affairs
- Foreign Service

Business and Marketing

- Sales
- Public Relations
- Finance
- Advertising
- Telecommunications
- Hotel and Restaurant
- Network Systems
- Travel and Tourism
- Insurance Research

Source

Lozada, M. (1995). A model reform. *Vocational Education Journal, 70*(8), 28-33.

C.5 *Philadelphia High School Academies*

Philadelphia, Pennsylvania

- Applied Electrical Science
- Business
- Applied Automotive and Mechanical Sciences
- Health
- Horticulture
- Environmental Technology
- Fitness, Health Promotion, and Sports Education
- Hotel, Restaurant, and Tourism

The Philadelphia High School Academies were established in 1969 with the introduction of the Applied Electrical Science Academy. Since that time, seven additional academies have been developed and implemented. Each academy integrates state-mandated academic courses *and* fully approved occupational skills training programs. Job-ready students are provided paid work experience (part-time during school, full-time in the summer and after graduation) through the program's business partners. Over 150 corporations and foundations support the Philadelphia High School Academies.

Source

Rigden, D. W. (1992). *Business and the schools: A guide to effective programs*. New York: Council for Aid to Education.

C.6 *Walhalla High School*

Walhalla, South Carolina

- Arts/Sciences/Human Services
- Business
- Engineering
- Health Services
- Trades and Technology
- Finance Academy
- Ford Academy of Manufacturing Sciences (FAMS)

Entering freshmen choose one major from the five career clusters and two academies available. Career clusters have been organized along a College Prep and Tech Prep continuum. College Prep provides students with extensive preparation for college-level work leading to a chosen career. Tech Prep prepares students for further technical college training or immediate entry into a chosen career. Students develop career portfolios, participate in information workshops conducted by a career specialist, and gain work experience through mentoring, job shadowing, and internship programs.

Source

McGraw-Hill. (1996). *New American high schools: Preparing students for college and careers*. New York: Author.

C.7 *William Turner Technical High School*

Miami, Florida

- Agriscience
- Applied Business Technology
- National Academy Foundation / Fannie Mae Academy of Finance
- Health
- Industrial Technology Public Service Television Production

William H. Turner Technical High School offers a "two-for-one diploma" that meets the requirements for entry into a two-year or four-year college *and* awards state certification in career training. Teachers in each of the academies develop Integrated Curricular Units (ICUs) that integrate academic content and technical competencies with the career content. SCANS competencies and Tech Prep initiatives are integrated into the curricula. Students select a career academy upon entering ninth grade and complete a sequence of core and elective courses leading to certification and graduation. Students also participate in a number of school-based enterprises and supervised work-based experiences. Job Prep courses are viewed as a valuable addition to academic education.

Source

McGraw-Hill. (1996). *New American high schools: Preparing students for college and careers.* New York: Author.

C.8 *Additional Schools*

Bryan Senior High School

Omaha, Nebraska

- Arts and Humanities
- Business / Information Systems
- Health Services
- Engineering Technology
- Public / Human Services

Source

U.S. Department of Education with the National Center for Research in Vocational Education. (1996). *New American High Schools conference honorable mention sites.* Berkeley, CA: Author.

Central Valley School District

Greenacres, Washington

- Business, Marketing and Management
- Business Communications and Operations
- Technology in Society
- Engineering, Science and Medical Services
- Creative and Applied Arts
- Social, Health and Personal Services

Source

Dunn-Gallagher, J., & Valmores, N. G. (1995). *Increasing rigor and relevance: Linking school-to-career: Best district practices.* West Sacramento: California School Boards Association.

Dade County Public Schools

Miami, Florida

- Educational
- Civil
- Environmental Pollution Control
- Nuclear Technologies
- Law
- Protective Services
- Fire Protection

Source

Dade County Public Schools. (1995). *Information brochure.* Miami, FL: Office of Applied Technology, Adult, Career, and Community Education.

Encina High School

Sacramento, California

- The Health Career Academy
- The Graphic Arts and Printing Academy
- The Business Career Academy
- The Career Exploration Academy

Source

Encina High School. (1995). *Information brochures*. Sacramento, CA: Author.

Gloucester High School

Gloucester, Virginia

- Health and Human Services
- Global Studies
- Environmental Scientific Studies
- Theoretical and Technical Studies
- Communication Arts

Source

U.S. Department of Education with the National Center for Research in Vocational Education. (1996). *New American High Schools conference honorable mention sites*. Berkeley, CA: Author.

Hamilton High School

Milwaukee, Wisconsin

- Carpentry / Drafting
- Hotel / Restaurant Management
- Fashion Merchandising
- Business Education
- Communication Arts

Source

U.S. Department of Education with the National Center for Research in Vocational Education. (1996). *New American High Schools conference honorable mention sites*. Berkeley, CA: Author.

Rezin Orr Community Academy

Chicago, Illinois

- Carpentry / Drafting
- Hotel / Restaurant Management
- Fashion Merchandising
- Business Education
- Communication Arts

Source

U.S. Department of Education with the National Center for Research in Vocational Education. (1996). *New American High Schools conference honorable mention sites*. Berkeley, CA: Author.

Roosevelt High School

Portland, Oregon

- Business and Management
- Health Services
- Manufacturing
- Engineering Technologies
- Natural Resource Systems
- Human Services

Source

U.S. Department of Education with the National Center for Research in Vocational Education. (1996). *New American High Schools conference honorable mention sites*. Berkeley, CA: Author.

St. Mary's County Technical Center

Leonardtown, Maryland

Four-Year College / University

- Engineering Mechanical Technologies
- Business Management Technologies
- Health / Human Services Technologies

Source

Dunn-Gallagher, J., & Valmores, N. G. (1995). *Increasing rigor and relevance: Linking school-to-career: Best district practices*. West Sacramento: California School Boards Association.

APPENDIX D

Examples of Theme-Wide Functions, Issues, Concerns, and Technological Knowledge and Skills

D.1 – Industry-Wide Functions and Issues

D.2 – Common Functions, Issues, Concerns, and Technological Knowledge and Skills

D.3 – Criminal Justice/Protective Services: Trends and Concerns

D.4 – Health and Human Services: Trends and Concerns

D.5 – Business: Trends and Concerns

D.6 – Marketing: Trends and Concerns

D.1 *Industry-Wide Functions and Issues*

An education for all aspects of the industry does not focus on one aspect of an industry; rather, it focuses on broad-based learning with an emphasis in each of the following areas:

1. **Structure and Organization:** This area relates to the functions and contributions of the industry in the economy, and how an industry is organized for the production of its primary products and services.
2. **History:** This area deals with the evolution of an industry, the forces that impacted the development, and those that are likely to shape future development of the industry.
3. **Technology:** The content of this area concerns the principles of technology that drive the production process in an industry, how such technology has changed over the years, and how it is likely to change in the future.
4. **Economics:** This aspect addresses the functional mode of an industry (locally, regionally, nationally, and internationally) and how industries relate with each other.
5. **Human Resources:** This aspect identifies the human resources that work within an industry, what they do, and what they need to know in order to work successfully in an industry. It includes learning about how workers learn and the ins and outs of the workplace social system.
6. **Government:** The content area includes business transactions with, and the interaction between, an industry and local, state, federal, and foreign governments.
7. **Health and Safety:** This area relates to the health and safety concerns associated with an industry, its work environment, and its products.

8. **Environment:** Questions that relate to the interaction between an industry and natural, built, and social environments are answered within this area.

Source

American Vocational Association. (1990). *The AVA guide to the Carl D. Perkins Vocational and Applied Technology Education Act of 1990*. Alexandria, VA: Author.

D.2 *Common Functions, Issues, Concerns, and Technological Knowledge and Skills*

A study to identify functions, issues, concerns, and technological knowledge common to various industries and fields was conducted by the Instructional Materials Laboratory at the University of Missouri–Columbia. These industries and fields included the following:

- Agricultural Production
- Marketing
- Health Services
- Transportation Maintenance
- Construction
- Personal Services
- Food Services
- Child Care
- Electrical/Electronics
- Printing/Graphic Arts/Drafting
- Agricultural Business
- Metals
- Office Occupations
- Computer/Data Processing

The following are the common functions, issues, concerns, and technological knowledges identified for these industries and career fields:

- Industry planning and products
- Transportation delivery system
- Societal impact of the product
- Market trend, including the global market trend
- Expansion plan, and plan to accommodate change
- Corporate chain of command, corporate culture, decisionmaking process, and management styles
- Customer satisfaction
- Leadership opportunities
- Financing and budgeting
- Business liability and protection costs (insurance)
- Relations with suppliers
- Materials purchasing
- Mark-up and profit
- Negotiation skills
- Time management techniques
- Computer use
- Problem-solving skills
- Team player skills
- Technical and general information
- Technology change and upgrading skills
- Worker's rights and responsibilities
- Customer rights and responsibilities
- Quality improvement programs
- Worker-employer relationship
- Benefits
- Career advancement
- Training opportunities
- Labor treatment
- Professional organizations
- Cultural sensitivity
- Health care
- Company's contribution to community
- Community's contribution to company
- Public perception and industry image
- Environmental impacts and long-term health hazards
- Waste disposal
- Regulatory compliance
- Safety training
- Stress management
- Ergonomics
- Crisis intervention
- Drug testing procedures
- Attitude, ethical conduct, personal discipline, good grooming, and appearance
- Harassment and right to privacy

Source

Instructional Materials Laboratory. (1993). *Methodology used in the project "All Aspects of the Industry" for vocational education programs.* Columbia: University of Missouri–Columbia. (ERIC Document Reproduction Series No. ED 367 818)

D.3 *Criminal Justice/ Protective Services: Trends and Concerns*

- Increase in older population
- Increase in immigrant population
- Increase in cultural diversity in the workplace
- Increase in violent offenders
- No-parole policies
- Harsher treatment of offenders
- Increase in numbers and complexity of individual property protection systems
- Increase in community-based corrections
- Inmate payment for custodial upkeep
- Computer technology
- Increase in educational requirements for corrections employment
- Increase in workloads/caseloads
- Civilian workers in jails
- Auxiliary programs
- Increase in attendance by private citizens at criminal justice academies
- Community college credit for completion of academy curriculum

Source

Virginia Community College System. (1996). *Occupational analyses: Health and human services.* Richmond: Virginia Vocational Curriculum and Resource Center, Author.

D.4 *Health and Human Services: Trends and Concerns*

- Technological advances
- Lasers replacing handpieces
- New vaccines
- Cosmetic procedures
- Disposable equipment
- Separation of waste
- Staff health/safety consciousness
- HIV post-exposure testing for staff
- Needle stick protocol/Infection control
- Paperwork increase (yearly OSHA update)
- Malpractice suit increases
- Patient confidentiality issues
- Regulatory climate changes
- Stress management skills courses/seminars
- Time management skills courses/seminars
- Crisis/emergency procedures
- Increase in the use of ultrasound procedures
- Increase in need for versatile employees who integrate skills from different departments through cross-training
- Cultural diversity awareness/Inclusion (Americans with Disabilities Act)
- Downsizing/Rightsizing (job security loss)
- Hospitals becoming more business oriented rather than service oriented
- Increase in temporary/part-time employment
- Increase in female domination of field
- High burnout rate
- Increase in government intervention
- Increase in establishment of specialized centers (separate from hospitals)
- Equipment becoming smaller, more portable
- Emerging use of CD-ROM technology
- Emerging use of teleimaging technology
- Home healthcare
- Decentralization
- Increased patient focus
- Stricter occupational certification requirements
- Workplace education incentives
- Office automation (electronic mail/faxes/voice mail)
- Team environment emphasis

- Employee empowerment emphasis
- Low-paying entry jobs
- Increased hiring of older persons
- Political correctness/sensitivity to cultural diversity
- Awareness of sexual harassment issues
- Impact of safety, health, and environmental regulations
- Impact of Fair Labor Standards Act
- Greater dependence on volunteers
- Shrinking budgets
- Public/private partnerships
- Demands for field to become more customer-driven/more revenue-producing
- Emphasis on high quality
- Privatization
- Social issues (substance abuse, school dropouts, family lifestyles, etc.)
- Tendency for public to think of recreation as the solution to social ills
- Pressure to achieve measurable results

Source

Virginia Community College System. (1996). *Occupational analyses: Health and human services*. Richmond: Virginia Vocational Curriculum and Resource Center, Author.

D.5 *Business: Trends and Concerns*

- Personal liability
- Negotiation skills courses/seminars
- Decisionmaking skills courses/seminars
- Re-engineering/downsizing
- Changing technology
- Lifelong learning emphasis
- Cultural diversity awareness
- Project management/teamwork
- Seasonal work
- Sedentary working conditions
- On-line services skills
- Computer literacy requirements
- Home computer use
- Movement toward wireless communication devices
- Movement toward directory services
- Accountability issues
- Multimedia/digitized media
- Work station design
- Security emphasis
- Outsourcing corporation services
- Telecommuting/satellite communication
- Interactive networking
- PEN-based computing
- Cross-training

Source

Virginia Community College System. (1996). *Occupational analyses: Business clusters*. Richmond: Virginia Vocational Curriculum and Resource Center, Author.

D.6 *Marketing: Trends and Concerns*

- Growth of consumerism
- Increase in government regulation
- Effective use of natural resources
- Developing new and better products
- Increased use of scientific marketing research
- Global marketplace/international trade increase
- Changing demographics
- Consumer satisfaction/decisionmaking processes
- Market segmentation
- Changing competition
- Broader marketing applications
- Recognized need for professional development/employee education programs
- Marketing applications of technology
- Employee and employer ethics
- Social responsibilities of companies

Source

Burrow, J., & Eggland, S. (1995). *Marketing foundations and functions*. Cincinnati: South-Western Publishing.

APPENDIX E

Related Materials, Reports, and Resources: A Selective Bibliography

A Selective Bibliography

Bailey, T., Koppel, R., & Waldinger, R. (1994). *Education for all aspects of the industry. Overcoming barriers to broad-based training* (MDS-243). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

This report evaluates the shift in printing and apparel industries toward innovative work organization. It assesses the extent to which educational reform might be promoted by new types of work organization, or be slowed down by the perception on the part of educators that firms do not want these new types of skills. The report presents educational and training strategies that serve these industries with an evaluation of the extent to which employers are implementing an all aspects strategy. Barriers to the development and diffusion of the all aspects approach are identified, and a summary of findings and policy suggestions for overcoming these barriers are presented.

Bragg, D. D. (1994). Emerging Tech Prep models: Promising approaches to educational reform, *Centerfocus* (Issue #5).

The fundamental components of Tech Prep are described and five emerging Tech Prep models are introduced. Specifically, the integrated Tech Prep model focuses on delivering academic and vocational education organized around broad career clusters.

Boston Vocational Education Revitalization Project. (1993). *New directions at Madison Park Technical-Vocational High School.* Boston: Author.

This resource can be used to develop thematic programs and curriculum. Part I gives educators an overview of the all aspects concept and describes six aspects of industry, including health and safety on the job, labor issues, principles of technology, management, finance, and community economic development. Part II provides strategies for implementing these into the curriculum. This section is organized around a ninth-grade academy and four clusters including Arts and Communications, Craft and Technical, Commerce, and Health and Human Services.

Bottoms, G. (1993). *Redesigning and refocusing high school vocational studies.* Atlanta: Southern Regional Education Board.

Blending academic and vocational education, connecting the school site to the worksite, and linking secondary and postsecondary education are addressed in this book. Information provided assists high school personnel in examining their current vocational programs and developing new programs that give students the quality of academic and

technical preparation that businesses and industries expect. *High Schools that Work* vocational programs involving youth apprenticeships, academies, magnet programs, business partnerships, and industry certification programs are examined.

Bottoms, G., & Sharpe, D. (1996). *Teaching for understanding through integration of academic and technical education.* Atlanta: Southern Regional Education Board.

This guide acquaints readers with practical, integrated instructional approaches and strategies that engage students in learning challenging academic and vocational content, and illustrate real-life uses of academic subjects. The guide is designed to help high school educators answer four basic questions concerning academic and vocational integration: (1) What is integrated learning?, (2) Why integrate?, (3) What conditions must exist to support integrated learning?, and (4) Where do you begin? Interdisciplinary integration approaches addressed in the guide include team teaching, short- or long-term projects, thematic projects, thematic units, and academies.

Career Connections Service. (1996). *Career pathways.* Virginia Department of Education, Office of Vocational, Adult, and Employment Training Services: Author.

Career Pathways is a booklet designed to help teachers and counselors plan and implement instruction that meets the needs of students investigating potential careers. Careers are organized into clusters of career fields. Phase 1 prepares students to investigate careers. Students identify their roles as workers in society, analyze their personal assets, complete a basic exploration of career clusters, and select career fields or occupations for further study. Students also secure job shadowing positions with local employers. Phase 2 involves an in-depth study of one to four career clusters, including student analysis of working conditions, need for workers, worker qualifications, organizational structures, and common problems and solutions. In Phase 3, students match their interests and aptitudes with occupational information, investigate a variety of pathways to career success, and reinforce knowledge and skills needed for paid employment. A Career Cluster Study Guide is provided as an example.

Center for Law and Education. (1996). *Resources for teaching all aspects of an industry.* Washington, DC: Author.

This resource identifies books, videos, organizations, and curricula materials that educators can use when teaching all aspects of an industry. Resources covering the "all aspects" approach, specific aspects of industry, small business development, entrepreneurship, and industry trends are provided in an annotated bibliography. Topics such as planning; management; finance; principles of technology; community issues; labor issues; and health, safety, and environmental issues are addressed.

Community and Schools of Charlottesville-Albemarle for Partnerships in Education (CSCAPE). (1996). *CSCAPE.* Charlottesville, VA: Author.

This booklet, developed by CSCAPE participants, addresses how local businesses and organizations can work with schools to develop and maintain partnerships that support work-based learning opportunities for all students. The benefits of school/community partnerships, partnership activities, and work-based learning definitions are listed. Student application forms, student performance evaluation forms, and student response forms are provided for the following work-based learning opportunities: job shadowing, mentorship, internship, cooperative education, and student apprenticeship.

de Leeuw, D., Hertenstein, C., Jackson, M., Lum, B. J., O'Donoghue, S., Rahn, M., Rubin, V., Stern, D., & Whitehurst-Gordon, A. (1992). *Examples of integrated academic and vocational curriculum from high school academies in the Oakland unified school district* (MDS-483). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

This report describes the Oakland Unified School District's district-wide Academies Magnet Program. These school-within-a-school magnet programs are designed to provide both academic instruction and career preparation. Fields represented are health, business, communications, engineering, computer technology, law, visual arts, and transportation.

Douzenis, C. (1994). Evaluation of magnet schools: Methodological issues and concerns. *The Clearing House, 68*(1).

This article discusses magnet school evaluation from several standpoints, with a strong emphasis on methodological issues and concerns. It is designed to help magnet school personnel and administrators recognize the need to familiarize themselves with methodological and evaluation issues associated with their particular magnet programs.

Education Development Center, Inc. (1996). *The national school-to-career consortium directory.* Newton, MA: Author.

The National School-to-Career Consortium (NSCC) is a collaboration of 24 organizations under the leadership of Education Development Center, Inc. Members of the consortium provide technical assistance to states awarded School-to-Work Opportunities Act implementation grants. This directory provides a name, address, and brief overview of each participating organization.

Grubb, W. N. (Ed.). (1995). *Education through occupations in American high schools. Vol. 1: Approaches to integrating academic and vocational education.* New York: Teachers College Press.

This publication examines curriculum integration from a variety of perspectives and presents it as a possible solution to many of the current complaints about secondary schooling in the United States. Two particularly relevant chapters are *The Career Academies* by Marilyn Raby (pp. 82-96), and *Coherence for All Students: High Schools with Career Clusters and Majors* by W. Norton Grubb (pp. 97-113).

Grubb, W. N. (1996, April). The new vocationalism. What it is, what it could be. *Phi Delta Kappan, 77*(8), 538-546.

The organization of integrated instruction around broadly defined occupations, combinations of occupations, and social issues is described in this article. The restructuring of high schools to enhance integration by using occupations to contextualize instruction is presented in three forms: (1) career academies, (2) clusters, and (3) occupational high schools and magnet schools.

Hamilton, S. F., & Hamilton, M. A. (1994). *Opening career paths for youth: What can be done? Who can do it?* Position paper presented at the American Youth Policy Forum in Washington, DC.

The authors suggest that although youth jobs can serve as a valuable introduction to employment, few jobs for young adults make use of their real skills, interests, and abilities. The challenge is to bring the existing components of the career opportunity system together as a coherent whole to better serve the needs of all young people. The components of a career opportunity system should include the following: work-based learning, youth apprenticeship, career information and advising, high academic standards for all, career majors and career academies, and

Tech Prep. The School-to-Work Opportunities Act provides a basis for starting a career opportunity system for noncollege-bound youths. Partnerships with schools, employers, government, the community, students, and parents must be organized to support and coordinate the career opportunity systems.

Imel, S. (1996). Selected school-to-work transition readings. *The ERIC Review, 4*(2), 25-29.

A number of readings on current school-to-work issues are highlighted in this annotated bibliography. Readings cover issues such as, but not limited to, contextual learning, cooperative education, parent and employer roles in school-to-work, innovative transition programming, worksite learning, and youth apprenticeship programs. Ordering information is included for each entry and ERIC document numbers are noted when applicable.

Instructional Materials Laboratory. (1994). *All aspects of the industry supplementary instructional modules*. Columbia: University of Missouri–Columbia, Author.

This reference directs teachers in the creation and refinement of all aspects programs for students preparing to enter the workplace. For those educators who have already established all aspects, the guide may serve "as a check-off sheet of areas which are worthwhile in the preparation of students for the world of work." Nine all aspects competencies are discussed. They are (1) how industry plans; (2) how industry is managed; (3) how industry handles capital and finances; (4) important technical and production skills; (5) important industry principles of technology; (6) important industry labor issues; (7) important community issues; (8) health, safety, and environmental issues; and (9) important aspects of personal conduct in industry. Examples and suggested activities for each of the competencies are provided. Questions and activities to access mastery of the subject matter are included.

Instructional Materials Laboratory. (1993). *Methodology used in the project "All Aspects of the Industry" for vocational education programs*. Columbia: University of Missouri–Columbia, Author.

During 1992, the Missouri Department of Elementary and Secondary Education conducted a statewide assessment to determine the extent to which "all aspects" was included in the vocational education curricula. Based on the assessment results, a program was developed to identify appropriate specific competencies that would provide strong experience in and understanding of "all aspects" in 15 industry areas.

Johansson, C. B. (1996). (6th ed.). *Interest determination, exploration and assessment system (IDEAS)*. Minneapolis: National Computer Systems.

The IDEAS materials include a workbook and a standardized career interest inventory for individuals from grade 7 through adult. The inventory results in an individual IDEAS profile indicating low, average, or high interest in 16 possible career interest areas, including nature/outdoors, creative arts, medical, mechanical/fixing, writing, food service, office practices, public speaking, business, sales, educating, child care, community service, science, mathematics, and protective services. Suggestions and resources for learning more about high interest areas are provided.

Lozada, M. (1995). A model reform. *Vocational Education Journal, 70*(8), 28-33.

Career clusters that aim to integrate academic and vocational education by guiding students through particular avenues of study are highlighted in this article. Career cluster examples drawn from several schools throughout the United States are included.

National Center for Research in Vocational Education. (1994). *All aspects of the industry: Bringing industry to the classroom* (MDS-839). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

This teleconference video provides an orientation to all aspects of the industry concepts, and presents strategies for implementing all aspects in the classroom. Ideas for using local and state policies to assist and enhance curriculum development and implementation are presented.

National Center for Research in Vocational Education. (1992). *Key issues in vocational education: Tip sheet for education writers* (MDS-035). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

This tip sheet provides information about key educational reform issues and advises education writers covering vocational education. Three reform issues are addressed: (1) integrating vocational and academic education, (2) Tech Prep, and (3) performance standards and measures. Several integration models are described including the academy model; occupational high schools and magnet schools; and occupational clusters, career paths, and occupational majors.

Newmann, F. M., & Wehlage, G. G. (1995). *Successful school restructuring: A report to the public and educators*. Madison: University of Wisconsin–Madison Center on Organization and Restructuring of Schools.

Specific educational innovations can be viewed as structural "tools" to be used for specific purposes in particular situations. The effectiveness of each "tool" depends on how well it organizes or develops the values, beliefs, and technical skills of educators to improve student learning. This report describes a research study conducted from 1990 to 1995 by the Center on Organization and Restructuring of Schools (CORS). The study examines how the "tools" of restructuring can be used to improve a school's human and social resources and, therefore, elevate learning for all students. Student learning, authentic pedagogy, school organizational capacity, and external support provide focus for the study.

Nielsen Andrew, E. (Ed.). (1996). *As teachers tell it: Implementing all aspects of the industry* (MDS-885a and 885b). Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

This report describes a collaborative effort between four national organizations and four school programs. A case study of each program describes the efforts to implement "all aspects" reforms. Each case study also addresses how the "all aspects" curriculum responds to changing economic, educational, and employment needs.

Pauly, E., Kopp, H., & Haimson, J. (1995). *Home grown lessons: Innovative programs linking work and high school*. San Francisco: Jossey-Bass.

Sixteen innovative school-to-work models are introduced in this report. Descriptions of school-to-work system implementation challenges, program content, student populations, employer involvement, and resource requirements are provided.

Pearce, E. (1996). Selected school-to-work transition resource organizations. *The ERIC Review, 4*(2), 20-24.

A directory of organizations that disseminate information, provide technical assistance, support collaborative efforts, and conduct demonstration programs and innovative projects in the school-to-work transition area is provided.

Rahn, M. L., Alt, M., Emanuel, D., Ramer, C. G., Hoachlander, E. G., Holmes, P., Jackson, M., Klein, S. G., & Rossi, K. (1995). *Getting to work: A guide for better schools*. Berkeley: National Center for Research in Vocational Education, University of California at Berkeley.

Getting to Work is designed to help educators reorganize education around the world of work. It directs educators in the preparation of students for employment, further education, and career advancement. This guide provides educators with the necessary tools needed to establish work-based and academic-oriented education programs. Five modules and an 89-minute video clip are included. Portions of Module Two are described below.

Module Two, Unit 2: Thematic Curriculum introduces educators to developing thematic curriculum units. Initially, educators learn to recognize common themes across subjects. Educators then select one subject area theme and one industry aspect around which to begin developing a thematic curriculum unit. In addition, educators examine examples of thematic curriculum units and evaluate their own work.

Module Two, Unit 3: Integrated Projects directs educators to select an industry around which to organize an integrated project. Educators then divide the industry into grade level themes and narrow the industry focus. Theme-related instructional activities, expected learner outcomes, teacher responsibilities, and evaluation criteria are determined.

Stern, D., Raby, M., & Dayton, C. (1992). *Career academies: Partnerships for reconstructing American high schools*. San Francisco: Jossey-Bass.

This book presents the career academy model in detail and explains how it can be designed to address current educational issues. Practical advice and case histories provide step-by-step guidelines for starting a career academy, integrating vocational and academic curricula, and broadening student career options.

Wilcox, J. (1991). Preparing students for the real world. *Vocational Education Journal*, 66(6), 38-40.

The Career Opportunity Paths in Education (COPE) program at Woodland High School in California focuses on the integration of academics and career exploration and guidance. Six career clusters of courses providing essential skills for immediate employment or post-high school employment are presented.